A GEOGRAPHY of NORTH DAKOTA

WILLIAM MARKS WEMETT

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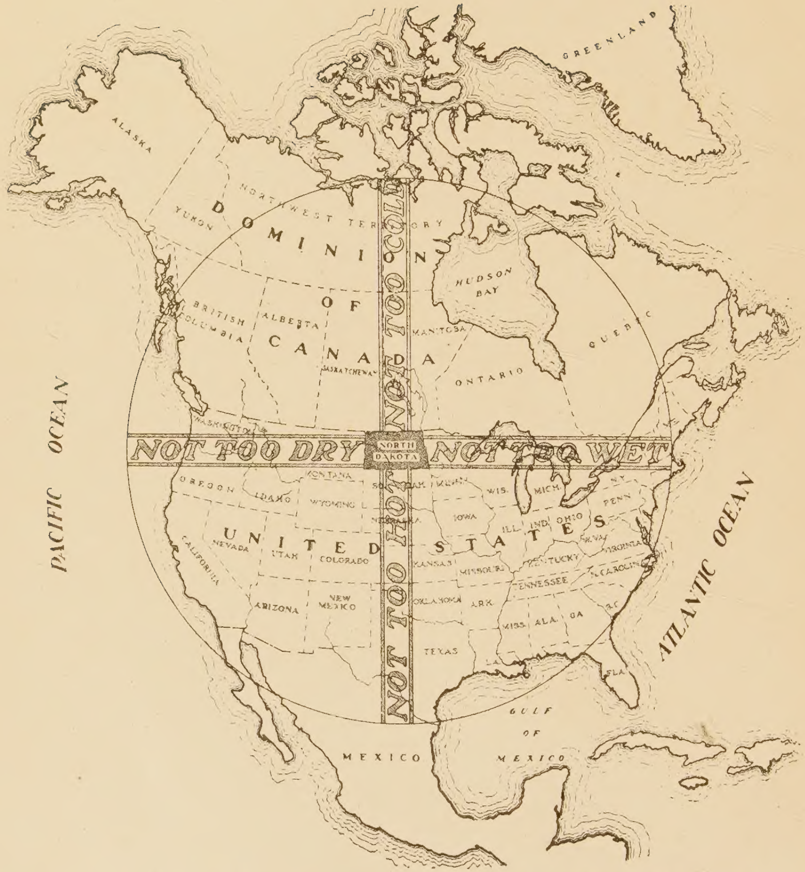

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North Dakota is the center of North America

A GEOGRAPHY
OF
NORTH DAKOTA

By
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Northern School Supply Co.,
Fargo, N. D.

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PREFACE

This book has been written to furnish the school children of North Dakota the material for a practical, working knowledge of the geography of their own state as required in the course of study. Its field being thus limited, it does not take up such general matters as the history of the earth's development, the earth's place in the solar system, the seasons, climate, rainfall, etc. These things are covered in the general subject of geography. This book undertakes merely to deal with the elementary principles of geography only as they apply to the state of North Dakota, and to give useful information concerning the people, resources, animals, plants, industries, highways, railroads, political units, institutions, parks, etc., and to suggest modern tendencies and opportunities for the future.

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A Geography of North Dakota

CHAPTER I

CLIMATE AND DRAINAGE

Why We Should Study Our Geography

It is important that we study the geography of our own state because it has so much to do with the way we live. The nature of the land, the climate and the natural resources determine how we shall make our living, whether we shall support ourselves by farming, manufacturing or mining. The climate, soil and drainage determine what crops will grow best. The nature and location of the minerals found under the soil decide for us whether mining will be profitable. The rivers and railroads show us how to get our products to market. The climate tells us what kind of houses it is best for us to live in, the kind of clothes we should wear, even the kind of roads we should build and where we should spend our vacations. The climate has a great deal to do with our comfort and happiness. In short, we should study the geography of our state because it enables us to make a better living and to live more intelligently and happily.

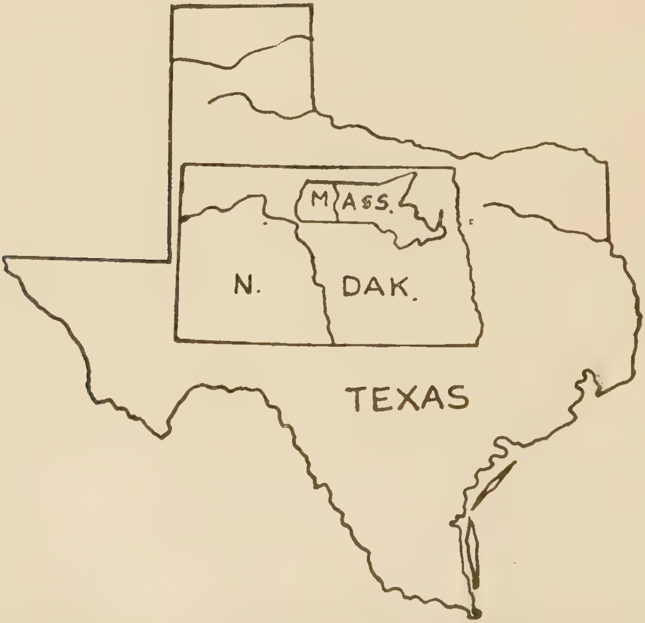
The Location of Our State

North Dakota is located in the very center of the North American continent. It is one of the northern tier of states and lies about midway between the Atlantic and Pacific coasts. The state occupies the great divide which separates the waters which flow into the Gulf of Mexico from those which empty into the Hudson Bay.

When white men first came into this region these waterways formed natural highways for them. As a result the eastern part of the state was first settled by people who came from the north by way of the Red River. The central and western parts were settled by people who made their way up the Missouri River from the south.

The state is bounded on the north by the 49th parallel, which separates it from the Canadian provinces of Manitoba and Saskatchewan. To the east lies the beautiful state of Minnesota with its great forests and thousands of lakes, separated from our prairie state by the Red River, which forms our only natural boundary.

South Dakota, our neighbor to the south, used to be united with North Dakota in what was called Dakota Territory. The two parts of the territory were separated by the line of 45° 55' when the two states were admitted to the Union in 1889. Our western boundary is the 27th meridian west from Washington, which separates us from the mountainous state of Montana.



The comparative area of Massachusetts, North Dakota and Texas

The location of our state has affected the life and industry of its people in two important ways. Having lain in the path of the great prehistoric ice sheet, the greater part of the state is an undulating plain called "the glacial drift area." The remarkable fertility of this region has made agriculture the principal industry. Also, the fact that the state is so far from the moderating influences of both oceans has given it extreme temperatures, its cold winters and warm summers.

Area

North Dakota is nearly rectangular in shape, 360 miles long from east to west along the southern border, by 210 miles wide from north to south. It contains 70,837 square miles, over 600 of which are occupied by lakes and rivers.

The state is nine and one-half times as large as Massachusetts, and about one-fourth the size of Texas. It ranks sixteenth in size among the forty-eight states.

Climate

The climate of North Dakota is healthful and invigorating in both winter and summer. The air is dry and bracing. There are marked changes in temperature, usually ranging from 90 degrees above zero in summer to 35 degrees below zero in winter. The highest temperature on record is 110 degrees; the lowest is 54 degrees below zero.

SUMMER. The usual summer temperature varies from 60 to 85 degrees, and is made pleasant by the dryness of the air. The marked humidity which is so common and is found so uncomfortable in the central states is unknown. The days are bright, the sky clear and cloudless, the air pure and the nights cool.

Because of the high latitude the summer season, free from a killing frost, is quite short, ranging from four months in the western part to five months in the eastern part. However, the shortened season is compensated for by the very long and sunny days. Thus the actual "growing hours" for North Dakota crops are as great as those of the other north central states.

FALL. In September there is usually a rainy and rather cold period, which is followed by several weeks of perfect autumn days known as "Indian summer", which sometimes extends into December.

This is a most beautiful time of year. The buffalo grass on the hillsides turns brown, the trees that line the river banks drop their leaves and take on a darker color, and the black plowed fields extend in every direction as far as one can see. The millions of wild ducks take their annual flight over the state toward the southland, stopping for a few weeks to feed in the stubble fields and the many sloughs. Then the "freeze up" comes, with light flurries of snow, and the earth and streams remain frozen until the middle of March.

WINTER. The winter is quite as bright and cloudless as the summer. The air is crisp and cold, but is pleasant and comfortable because of the low humidity. It is free from alternate freezing and thawing, with the accompanying mud and slush, found in other states. The snowfall is light and dry and easily blown about, so that the plowed fields are often bare, and the grazing plains of the western part of the state are free from snow and covered with feeding cattle most of the winter.

Because of the distance from the moderating influences of the oceans there are extremes of temperature. Usually in the last of December and again in February there is a severe cold period for a week or more when the thermometer drops to 30 degrees or even 40 degrees below zero. In January there is usually what is called the "January thaw," a warm spell of two or three weeks, caused by the warm "Chinook" winds which come from the higher altitudes farther west.

During the winter months the state is subject to occasional blizzards. The temperature drops to below zero, a high wind with a heavy snow make a driving, blinding storm which obscures roads and landmarks, often causing people to loose their way and perish. These storms are dangerous because they come with such suddenness and fury that people are caught traveling on the plains and cannot find their way home. If the storm happens to come late at night or in the morning little damage is done, for people are in their homes and stay there, but if it comes in the middle or latter part of the day, many people are caught out and there is some loss of life.

Because of these occasional blizzards houses and barns are protected by wind-breaks, rows of trees set out for that purpose. The steady cold weather freezes ice three and sometimes four feet thick and it is necessary to bury water pipes to a depth of eleven feet.

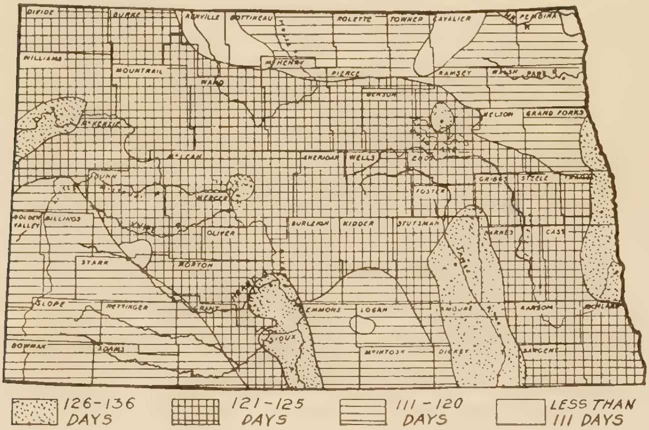
SPRING. About the middle of March the ground begins to thaw out. The ice breaks up and flows down the rivers. The wild ducks and geese take their northern flight to their nesting grounds in Canada. Crocuses begin to cover the prairie. The box elder trees put forth the first leaves. The trees along the rivers are filled with many varieties of song birds returning from the south. Robins, blackbirds, and rose-breasted grosbeaks fill the air with their happy song, telling us that spring has come. In a short time the farmers are in the field sowing their spring wheat, the famous hard wheat which has led people to call North Dakota the "bread basket of the nation."

Spring is marked by frequent winds. Before the grain is up the light soil is often blown into "dust storms," making much work for the housewives. This dust in the air is the cause of the magnificent sunsets, most frequent in spring and autumn, for which the state is noted. Then the spring rains come, and the state becomes a carpet of waving, green grain and rolling pasture lands.

Frost-free Season

It is very necessary in an agricultural state like ours that there be sufficient time for crops to mature between the last killing frost of spring and the first killing frost of autumn. In North Dakota this frost-free season varies in length from 110 to 136 days on the average, depending upon the location.

Flax requires about 90 days to mature. The usual varieties of corn require 105 days. Wheat, barley and oats are free from frost danger because of their short period of maturity and their frost-resisting nature. From these facts it is seen that these crops can be grown in North Dakota with a comparatively safe margin of time. There are only two small areas in the state in which the average frost-free season is less than 110 days and in which corn growing is therefore hazardous. One of these areas covers Renville County and the western half of Bottineau County, the other covers the western half of Cavalier and the eastern part of Towner counties.



(Courtesy of N. P. Ry.)

This map shows the average length of the frost-free season in various parts of the state.

In two-thirds of the state's area, in all except the northeastern and southwestern parts, the frost-free season is from 120 to 125 days. In the section northeast of Devils Lake and southwest of Dickinson the frost-free season is somewhat less, from 111 to 120 days. This is also true of Logan and McIntosh counties.

From these facts it is evident that the common grains, including flax and corn, can be grown in nearly all parts of the state with little fear of frost. It is true that we often find these crops damaged, due to late seeding, which is the fault of the farmer rather than of the weather. All of these crops are grown successfully and profitably by intelligent farmers in nearly all parts of the state. The map shows two regions only where the growing of corn is hazardous.

Rainfall

The average annual rainfall in the state is not high, being only 18 inches, but fortunately from two-thirds to three-fourths of it comes during the growing season, which makes an excellent condition for agriculture.*

You will notice from the map that the average annual rainfall is highest in the southeastern part of the state, being nearly 25 inches at Fargo, and lowest in the northwestern and southwestern parts, where it is under 16 inches. In the large central section, two-thirds of the state's area, it ranges from 16 to 20 inches.

Since this average annual rainfall is not as great as in some other states farther east and south, some people have the impression that North Dakota does not have sufficient moisture for agriculture. This conclusion is not correct. Since more than two-thirds of the rainfall in this state comes during the growing season, the amount which is useful to growing crops is greater than in some states which have a greater annual rainfall. Many of those states have a large proportion of their rainfall in the late fall and winter when it is useless. Thus, while the annual average in the upper Red River valley is only about 25 inches and that of northern Ohio is over 35 inches, the rainfall of the upper Red River valley during the growing season, the useful rainfall, is slightly greater than that of northern Ohio.

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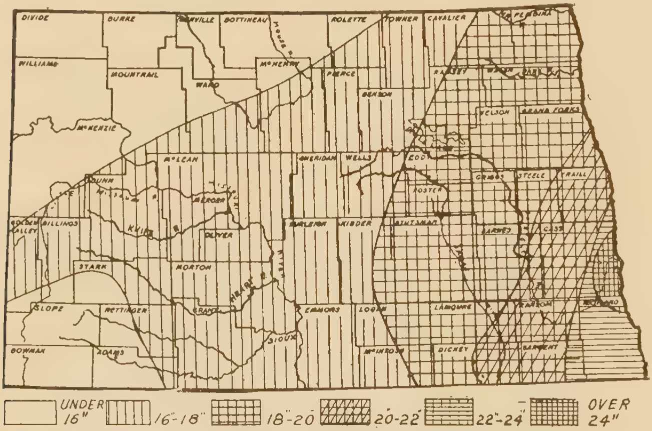
* Note. According to the U. S. Weather Bureau records of the past twenty years the percentage of annual rainfall coming during the growing season has been 65 per cent. at Fargo, 60 per cent. at Jamestown, 68 per cent. at Bismarck, and 69 per cent. at Beach.

There is another advantage which makes the rainfall in North Dakota well suited to agriculture. The state is so nearly level that the rains are not carried off rapidly in rushing, flooded rivers. It sinks into the rich loam soil where the crops get the benefit of it. In states with a more hilly surface and a heavier soil the rains are often carried off in torrents with much damage to crops and property. North Dakota gets full use of what rainfall it has. This is sufficient for general agriculture, except in the northwestern and southwestern parts. Those two areas, however, are especially well adapted to stock raising.



(Courtesy of N. P. Ry.)

This map shows the average annual rainfall in various parts of the state.

Drainage

North Dakota lies on the great divide which separates the waters which flow into the Gulf of Mexico from those which flow into Hudson Bay. The state is about evenly divided by this watershed. (See map.) The northeast half is drained through the Red, Sheyenne and Mouse rivers northward and eastward into Lake Winnipeg and thence by the Nelson River into Hudson Bay. The southwest half of the state is drained by the Missouri River and its branches southward into the Gulf of Mexico. The Missouri River has several tributaries on the west, the Little Missouri, the Knife, the Heart and the Cannonball. It has no branches of importance on the east or north sides. The center of the state is drained southward by the James River, which empties its waters into the Missouri, in the southern part of South Dakota.

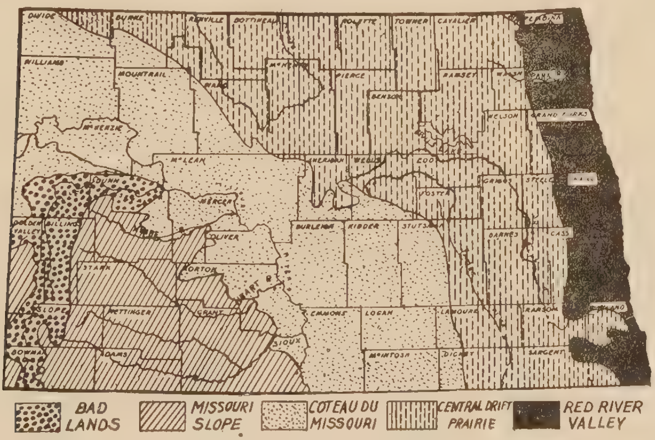
In the north central part of the state there is a large interior drainage basin containing about 3500 square miles. There are many lakes in this area, the largest of which is Devils Lake. There are no streams of importance. The waters of the lakes are brackish and unfit to drink. They are rapidly drying up from rapid evaporation, forming many serious problems. ✓

CHAPTER II

HOW THE RED RIVER VALLEY WAS MADE FROM AN OLD LAKE BED

The Three Natural Regions

North Dakota is, on the whole, a level state, with flat or rolling prairie stretching its whole length and breadth. A more careful examination shows that there are three distinct prairie levels rising by terraces as one passes from east to west, the Red River Plain, the Drift Prairie, and the Great Western Plain.



(Courtesy of N. P. Ry.)

The natural divisions of the state are shown on this map.

The Red River Plain

At the east side of the state the Red River Plain stretches its fertile floor, seemingly as flat as the ocean itself, without hill or knoll of any kind, from South Dakota to the Canadian border. This plain is the bottom of a prehistoric glacial lake, called Lake Aggasiz in honor of the famous scientist, Louis Agassiz, who first made a scientific study of glaciers and their action.

The Old Lake Bed

At the Canadian border this old lake bed is about sixty miles wide, lying about half in North Dakota and half in Minnesota, extending into this state as far west as the Pembina Mountains at Walhalla. At the Canadian border this plain is 800 feet above sea level. From that point it rises very gradually, about one foot to the mile, toward the south, where it narrows down to a point at Lake Traverse.

So nearly level is this plain that the water flows off very slowly, making it necessary to drain the land with large drainage ditches. Even then it is easily flooded by heavy rains. In 1852 this prehistoric lake bed was again filled with water for a few weeks, due to the blocking of the Red River with ice near Winnipeg, and Charles Cavalier went from Pembina, North Dakota, to St. Paul, Minnesota, in a rowboat.

The Lake Shore

The old lake shore is easily seen as one passes from the level valley to the west. At the northern or lower end of the valley the Pembina Mountains form the western shore. Where the Northern Pacific Railroad crosses the valley the west shore is seen at Wheatland. It is marked by rising ground and gravel banks. At the southern or upper end the west shore is shown by a series of sand hills and dunes near the spot where the Sheyenne River once flowed into the lake.

Its Great Size

The prehistoric Lake Agassiz was an immense body of water, probably 700 miles long, extending far north into what is now Canada, gradually widening out to a width of several hundred miles. It was larger than all of the five great lakes combined. Its depth varied at different stages of its life, as shown by various beach levels. At its greatest extent it was at least 300 feet deep at Fargo, 450 feet at Pembina, and very much deeper farther north.

How It Was Formed

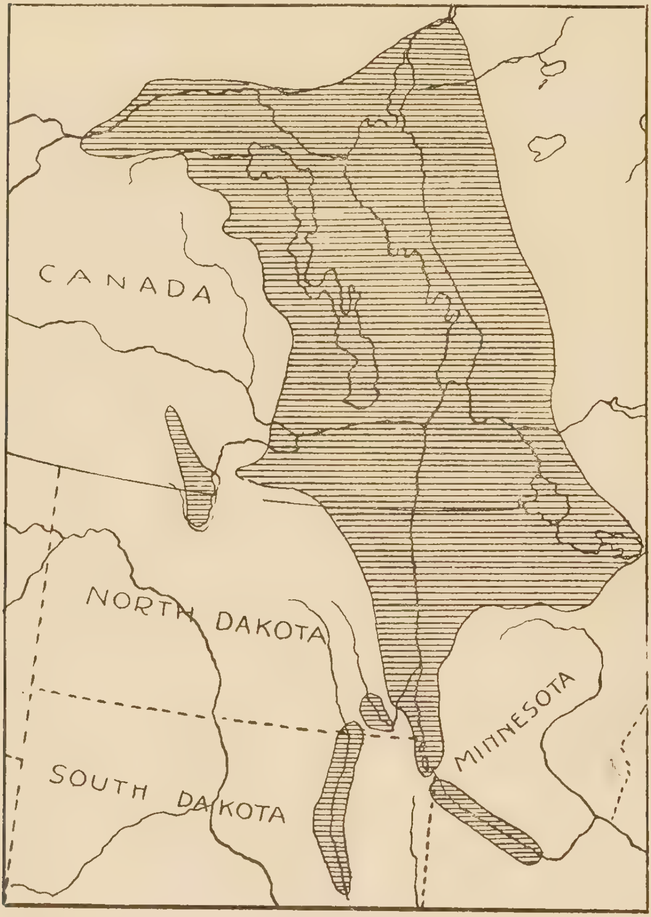
This lake was formed by the melting of a great glacier known as "the western ice sheet." This glacier had pressed down from the north, grinding and scraping its way over Minnesota and the eastern half of North Dakota, far down into Iowa, covering this region with ice to a depth of a half mile or more. Later the glacier began to melt at the south end, and, as it melted, began to recede northward.

The water from the melting ice flowed off southward by the channels of the Minnesota and Mississippi rivers. This process continued without change until the receding southern end of the glacier had reached a point as far north as the northeastern corner of South Dakota. At that place it came to a high ridge of ground with lower ground to the north. As the glacier continued to melt and recede northward, the water from it, unable to pass southward over the ridge, began to back up north of the ridge and form a small lake. This was the beginning of Lake Agassiz.

As the melting ice sheet continued to recede northward the lake grew larger and larger, held in place on the south by the ridge of ground mentioned, by rising ground on the east and west sides and by the ice sheet at the north. When the ice had receded far north into Canada lower ground was reached, which enabled the lake to break from its confines and discharge its waters into Hudson Bay.

Only the Red River Remains

This draining of the lake left the Red River Valley with its flat floor of deep, rich silt. The Red River remains to drain the valley and to show us where the deepest part of the lake was. Many short streams flow into it from the Dakota side, the Wild Rice, the Goose, the Turtle, the Park, and the Pembina rivers, draining the sides of the valley into its main channel. All of these streams are sluggish because the surface is so level. They are crooked because they can hardly tell which way to flow. The water is dark and dirty with its heavy load of silt. Along these streams there are no scattered boulders, only black mud, revealing as rich a soil as can be found on the earth.



This map shows the five glacial lakes described in the text.

CHAPTER III

HOW THE GREAT ICE SHEET MADE THE CENTRAL DRIFT PRAIRIE

The Drift Prairie

The Drift Prairie occupies the whole central portion of the state, extending the entire distance from north to south and from the west shore of glacial Lake Agassiz nearly to the Missouri River. This region was covered by the western ice sheet and is called the drift prairie because the receding ice sheet left it strewn with glacial waste.

The Work of the Ice Sheet

It is difficult to conceive of the devastating effect of the great ice sheet upon the surface of the earth. Imagine a great mass of ice, larger in area than the United States, several miles deep, being pushed southward from northern Canada, by the weight of more ice behind and on top of it, grinding and scraping its way over the surface of this state. As it moved slowly southward it scraped off the tops of hills, it filled in the lower places with the waste, gauged out huge cavities and ground great masses of rock into gravel and powder. Then, as it melted and receded, it left piles of dirt which we call hills, and scattered upon them boulders which it may have carried for hundreds of miles. The lower places it filled with water, forming many lakes, and left its melted ice water to flow off as best it could, forming the valleys and rivers we have today.

Such is the origin of the drift prairie in the central part of our state. Let us look more carefully at some of its features.

Other Prehistoric Lakes

Within this central drift plain the ice sheet left the glacial lakes in about the same way as it left Lake Agassiz. One of these was left in the northern part of the state in the loop of the Souris or Mouse River. It is called Lake Souris. It finally found an outlet through the Assiniboine valley and drained into Hudson Bay. The second was Lake Dakota which lay in what is now the valley of the James River, partly in North Dakota and partly in South Dakota. It finally drained through the James River into the Gulf of Mexico. In the southeastern part of the state, between old Lake Dakota and Lake Agassiz, was glacial Lake Sargent, which finally drained through the James River.

All of these lakes are gone now, and have been for thousands of years, but the regions they occupied are easily recognized by their flat surface and rich, heavy loam. In wet weather they are difficult to drain, and unsurfaced roads are impassable.

The Interior Drainage Basin

In the northeastern part of the state is a large undrained area called the interior drainage basin. Within it are many lakes, with small streams running into them, but they have no outlets. The largest of these is Devils Lake. Many lakes in this area have dried up and disappeared. The others have been decreasing in size through evaporation. Their water is brackish, or salty, as a rule, and unfit to drink. However, some of them, such as Sweet Water Lake, contain good water. There are many swamps and undrained areas, which are usually dry a part of each year.

How Devils Lake Was Formed

Devils Lake, called by the Indians "Mini-Waukan" or Spirit Lake, is the largest body of water in the state. It lies in the southern part of the interior drainage basin, surrounded by majestic, wooded hills, forming one of the many beauty spots of the state. The lake has no outlet, making its waters brackish and unfit to drink. In former times it drained through Stump Lake into the Sheyenne River, but the lake has so shrunken by evaporation that its waters have long been below the level of the outlet.

It lies in the bed of a prehistoric river which flowed from glacial Lake Souris into Lake Agassiz through the Sheyenne valley. This river valley was nearly filled with waste by the receding ice sheet, leaving basins here and there which were filled with water and now remain as a broken chain of lakes extending from the Turtle Mountains to Stump Lake.

So rapidly has Devils Lake been shrinking that many people fear that great damage may be done to their lake property, farms, cottages, piers, etc., by being left at a long distance from the water. It has been proposed that water be drained from the Missouri River into Devils Lake, filling it up to the desired level, and be carried off through Stump Lake and the Sheyenne River as in ancient times.

The Turtle Mountains Resisted the Ice Sheet

What are popularly known as the Turtle Mountains are a group of hills, forming a broken plateau, about 700 square miles in area, on the boundary between Bottineau County and Canada. They rise above the surrounding plain about 500 feet and are well wooded. In the many depressions among the hills lie a number of beautiful lakes, of which Lake Metigoshe is the largest.

Because of the timbered area in the hills a school of forestry was located nearby at Bottineau. The purpose of this school has since been changed. A state fish hatchery is located at Fish Lake.

These hills existed before the glacial period and were probably a part of the Missouri Plateau. The invading ice sheet, in its southern course, scraped off the tops and sides of the hills to a great extent and scattered the waste over the plains to the south. However, when the ice sheet melted and receded northward it left a deep layer of silt, sand, gravel and boulders over the hills, giving them every appearance of a moraine, or glacial deposit. Much of the silt has washed from the highest elevations, making many fertile valleys among the hills.

The Turtle Mountains formed a prominent land mark for the explorers and fur traders who traveled from Lake Winnipeg southwestward to the Missouri River, and westward to the Rocky Mountains. Since the Indian wars the eastern portion of the hills has been set aside as a reservation for the Cree Indians, a branch of the Chippeways, who have always been friendly toward the United States. Practically all the Indians living there now are half-breeds. Less than a hundred full-blood Indians remain. Nearly all of them have become citizens and land has been allotted to them.

The Drift Prairie is Separated From the Other Natural Divisions by Coteaus

As stated before, the state of North Dakota is made up of three plains, the Red River valley, the central drift prairie, and the western plateau, rising one above the other in steps from east to west. Therefore the central drift prairie "steps" down to the Red River valley on the east and "steps" up to the western plateau on the west. Each of these steps is made by a range of hills called coteaus, (the French word for hill). The eastern range, the one by which the Red River valley rises to the central drift prairie is called the coteau des prairies, (the hills of the prairie). The western range, by which the central drift prairie rises to the western plateau, is the coteau du Missouri, (the hills of the Missouri).

The coteau des prairies extends from the northeastern part of South Dakota northward through Walhalla, North Dakota, and thence northwestwardly far into Canada. Through most of its course it forms the western shore of old Lake Agassiz.

What the Coteau des Prairies is Like

In South Dakota these hills are an irregular mass, strewn with granite boulders or "hard heads", a typical glacial moraine, untimbered, and filled with numerous small lakes, but no streams. Through most of eastern North Dakota the coteau is low and in some places hardly noticeable. In the northeastern part of the state, however, it rises abruptly about 500 feet above the Red River valley, forming what are known as the Pembina Mountains. At Walhalla the "mountains" are well timbered and form a beautiful contrast to the comparatively level country to the east and west. In early days this region was called the "hare hills" and was a prominent hunting and fur trading region.

The coteau du Missouri is a part of the western plateau and will be described in connection with that region farther on in this chapter.

The Surface of the Drift Prairie is Rolling

The surface of the drift prairie is that of a gently rolling plain, well drained, but untimbered except in the river valleys. Before the white men came this region was covered by a thick carpet of buffalo grass. Many unplowed hillsides are still in that primitive condition, but practically all of this area is now under cultivation.

Here and there are moraine hills or ridges of hills one or two hundred feet in height, which blend gradually into the rolling surface about them. Occasionally there is a more prominent hill, improperly called a "butte," such as Hawks Nest near Carrington and Butte Michaud northeast of Cooperstown. The surface is cut with many streams, which usually meander through valleys much too large for them, because their work is now so much less than in glacial times, when their valleys were taxed to the utmost to carry off the waters of the melting ice.

There Are Many Lakes

There are also many lakes, whose untimbered shores are strewn with glacial boulders, scattered over the central and northern part of the area. Some are sweet water lakes, some are alkaline, some brackish.* Some are drained into the rivers, but for the most part they have no outlets. Most of them have muddy bottoms and shores, strewn with glacial rocks. Sandy beaches are very rare.

The Soil is Rich

The soil of the drift prairie is what was left by the receding ice sheet. It is mostly a very rich loam with a clay subsoil. In some places it is mixed with sand and gravel. All of it was once rock, but was ground and powdered into what it is by the glacier. Even the finest of it, the clay, is powdered rock, called rock dust. Only the thin covering of black top soil has a vegetable origin. It is the decayed remnant of buffalo grass and weeds that have grown there since glacial times.

The soil is rich with needed plant food elements, lime, potash, nitrogen and phosphorus blended so as to make the land very productive. Most of it is silt loam, sandy loam and clay loam, black and rich for a depth of from fourteen to eighteen inches, with a fine clay subsoil underneath. Practically the whole drift prairie is highly productive and easily tilled, all except the hills and ridges, which are usually too stony, and some localities which are too alkaline.

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*Note. Geologists tell us that these lakes are salty from the alkaline salts left in the soil by the salt sea waters when the state was entirely covered by the ocean, long before the glacial period.

CHAPTER IV

HOW THE MISSOURI PLATEAU WAS LEFT BY THE OCEAN

What the Missouri Plateau Is

The Missouri Plateau is a tableland which occupies the southwestern half of the state, rising about 500 feet above the level of the central drift plain and separated from it by the coteau du Missouri, which forms its eastern border.

At one time, long before the glacial era, the sea covered the western half of North America, except a part of the Rocky Mountains, flooding all of what is now North Dakota.

Only Part of it is Glaciated

Since then the land has been raised above sea level, the waters have flowed off, and two great ice sheets have invaded the state from the north. The first one covered all of the state except the southwest one-fourth, as far as the glacial drift line shown on the map, scraping and guaging the surface and leaving it covered with glacial drift. After it receded, a second ice sheet came from the north, covering the northeast half of the state, pressing as far toward the southwest as the Coteau du Missouri, depositing those hills as a terminal moraine.

From these facts we see that only the northeastern part of the Missouri Plateau, that part which lies along both banks of the Missouri River, was ever covered by a glacier, or was "glaciated," as the geologists say. The southwestern part of the plateau is as the sea left it, except for the continuous action of rain, wind and frost, which have caused the rocks to crumble into soil.

Many features of this western part of the state, popularly called the "Missouri Slope," deserve our special attention.

The Coteau du Missouri

As we have seen, the central drift plain rises to the western plateau by a mass of broken hills called the Coteau du Missouri. This is a chain of morainic hills extending from the northwestern part of the state, between the Mouse and the Missouri rivers, southeasternly to the South Dakota line, keeping midway between the Missouri and James rivers. It was deposited by the second ice sheet on the very eastern edge or shelf of the western plateau, just where it drops down to the central drift plain. The region is very rough. The ridges and hills are covered with glacial boulders, but are not timbered. There are no streams, but many lakes lie in the depressions among the hills. These lakes are undrained, some fresh and some alkaline. For the most part the land is too rough and stony for cultivation, though the soil is fertile. It is used for grazing.

In some places the coteau drops quite abruptly to the drift plain, its eastern side being marked with deep gullies and ravines. In other places it slopes gradually, by a series of small hills to the plain below, indented here and there by broad, level meadow lands.

On the western side it slopes down to the Missouri River by wide and deep valleys made by the glacial waters in their rapid descent to the river.

The Badlands

At the western end of the state the Little Missouri River winds its way northward to a position northwest of the Killdeer Mountains, where it turns abruptly eastward and flows into the Missouri. The extremely rough and broken valley, from ten to twenty miles in width, which the Little Missouri and its short tributaries have carved out of the plain is known as the Badlands, so named by the early travelers because they were bad lands to travel through.

In other ways, also, the name is very fitting. The soil is

A scene in the Badlands. Notice the old road and the new one. (Photo by Russell Reid) a soft, crumbling clay, often mixed with sand, and has therefore been easily eroded into the most fantastic forms. The region is an intricate network of precipitous chasms and ravines winding in every direction. The tops of the flat-topped hills, called "buttes," show where the level of the plain was before the river cut it into gorges from 300 to 500 feet deep.

The clay banks and precipices are a dull gray and yellow for the most part, shot through with outcropping veins of coal. The tops of the buttes are often capped with masses of brick-red scoria, which were undoubtedly formed by burning beds of coal, making brick of the adjoining layers of clay. It is a picturesquely wild place, where the hills and rocks seem to have been tumbled together without plan or reason, as if Nature were in a most humorous mood.

Professor Daniel E. Willard, in his excellent book, "The Story of the Prairies," describes the Badlands thus: "Steep hills with ugly, bulging flanks stand foot to foot, corrugated up and down their naked sides with rain gutters. Sharp-crested ridges wind in and out forming cirques and amphitheatres at the heads of streamless valleys below. The divides between tributary valleys are often sharp-crested ridges not inappropriately called knife edges. Vertical pillars and walls of clay, veritable mud fences, stand along the sides of deeply worn channels. From within the valleys no extended view can be obtained; the observer is surrounded by vertical or steep-rising slopes on all sides. From the top of a lofty butte the landscape appears a myriad of hilltops closely set together and massed back of each other until they blend far away in a level sky line."

The Indians called the Badlands "The-place-where-the-hills- look-at-each-other."

The Burning Coal Mines

The several strata of coal which underlie nearly the whole western half of the state outcrop in many places in the Badlands, where eroding waters have cut deep into the earth. At some places the outcropping coal veins have become ignited, probably by prairie or brush fires, and are still burning way back under the soil. Over these areas the earth has been undermined and has fallen in. Through the network of cracks in the baked soil pour stifling gases and the heat waves rising therefrom can be seen from a distance. By looking down into the crevasses of some mines one can see the earth glowing red and even white with the terrific heat. In the burned out area the clay is baked to a brick red, showing that the layers of scoria so frequent in the Badlands probably had their origin in burning veins of coal.

The Buttes

A butte is a flat-topped elevation which has been gauged out of a plain by the action of water. The top of the butte is on a level with the surrounding plain, or where the plain was before it was washed away. At the top of the butte there is usually a layer of rim-rock which has protected it from erosion. They are usually found where the soil is easily washed and where there is sufficient drop in the surface to produce swift-flowing streams, such a region as the Badlands, where there are thousands of buttes of all sizes and shapes. Sometimes they are so close together that they are separated only by narrow chasms. Sometimes they stand alone, rearing their huge forms hundreds of feet above the surrounding country, like silent sentinels of the plains. Such is the appearance of Sentinel Butte and Black Butte, the highest in the state, which rise more than 700 feet above the surrounding country.

How the Missouri Plateau is Drained

The western plateau slopes gradually from the southwestern corner of the state toward the north and east to the Missouri River. It is well drained by the Cannonball, the Heart, the Knife and the Little Missouri rivers. There are no lakes, because the rivers have had such a long time to thoroughly work back their heads and branches into every depression which needed draining.

The Age of the Missouri Plateau

The surface of the western plain is very, very much older than the other two natural divisions of the state. It is difficult to be at all accurate in measuring the great stretches of time that it has taken nature to make these regions what they are, but we can think of the glaciated part of the state as being comparatively young. It may be ten or twenty thousand years since the ice sheet receded and left the eastern half of our state to be eroded by rains and rivers. This process is still in operation, constantly making changes in the surface. But the western half of the state is so much older that we can hardly conceive of it. According to the calculations of geologists, made from a study of the rock formations, it would not be far wrong for us to think of the western plain as being something like three million years old. Vast ages have elapsed since that region was pushed up through the waters of the sea and became dry land.

The Rivers and Buttes Show Great Age

The rivers, except the Little Missouri, are in their old age. They have had time to erode their valleys to a great width and drain the country thoroughly. Their work is now about done. The great buttes, such as Rainy Butte and White Butte, whose tops show us where the level of the plain once was, tell us a mute but impressive story of the ages through which the waters have been at their process of erosion.

The Little Missouri is a Comparatively Young River

The river which we call the Little Missouri is a much younger stream than the Cannonball, the Heart, or the Knife. This is shown by its comparatively narrow and deep valley, usually not more than twenty-five miles wide. Sometimes the soft clay banks rise perpendicularly from the very edge of the water to a height of several hundred feet. This river probably began as a little stream flowing into the great Missouri. The soil there happened to be soft and easily washed. The drop into the Missouri was steep. Heavy rains rapidly cut the channel deeper and deeper, and pushed the head of the stream farther and farther back into the soft soil until it reached nearly to the western end of the state, and thence southward into northeastern Wyoming.

The process of erosion in this river is still going on rapidly, continually cutting out the soft banks of the Badlands and carrying the clay down to the Missouri in the muddy waters. As an illustration of this rapid erosion, in 1926 thousands of tons of clay slid down from the bank at the village of Medora in a single night, in one roaring, crashing landslide.

The Missouri, One of the World's Largest Rivers

The Missouri River is really the same stream as the lower half of the Mississippi. The upper half of the Mississippi is really, from its geological history, a tributary flowing into the main river from the north. The Missouri River rises in the Rocky Mountains in the southwestern part of Montana. Combined with the lower half of the Mississippi it is the largest river in the world. Its immense channel is 500 feet deep and a mile wide here in North Dakota, two thousand miles from where it empties its waters into the Gulf of Mexico. Its swift waters are filled with silt and sand, giving it a yellow, muddy appearance, and earning for the river the name of the "Big Muddy."

The Reason for the Missouri Floods

The Missouri is subject to extremes of high and low water. In the early fall of a dry year it appears almost dry, only a narrow yellow stream winding its way through a muddy flat. Sometimes in the spring when the snows on the mountains and on the plains melt at the same time, accompanied by rain, the river becomes a terrific torrent, filling its channel from bank to bank, occasionally tearing away whole farms in its irresistable flood.

(Photo by Russell Reid)

Senator Frazier and representatives of the federal park board crossing the Little Missouri River to visit the petrified forest.

The Missouri Once Flowed Into Hudson Bay

Geologists believe that the Missouri, before the glacial era, flowed northeastwardly into Hudson Bay. The whole plateau region of Montana, northern Wyoming, and western North Dakota slopes in that direction. This is shown by the direction taken by the upper Missouri until it reaches the Dakota line, and by the Yellowstone, the Tongue, the Powder, the Bighorn, and the Little Missouri. When the great ice sheet, probably a mile thick, pressed southward into the state as far as the line marked by the Coteau du Missouri, the great river either had to back up and form a great lake or turn along the edge of the ice toward the southeast. It turned southward and followed the edge of the glacier to its very southern end in what is now the state of Missouri. When the ice sheet melted, the coteau deposited by it formed a dam which has held the river in its new course ever since.

How the Missouri Has Affected Our History

The "Big Muddy" Missouri has had a great influence upon the history of North Dakota. By this liquid highway the Mandan Indians made their way into the state, and for a century or more before the coming of the white man they tilled their fields of corn, beans and squashes upon its banks. The early Spanish fur traders came that way, followed by the first daring explorers, Lewis and Clark, and later by such travelers as Catlin, Audubon and Maximilian who have done so much for our history and science. During the Indian wars troops were thus transported against the hostile tribes, and in the days of the gold rush to Montana and Idaho all kinds of craft from the canoe and mackinaw boats to the great side-wheel steamboats rushed the gold seekers westward. The river is navigable as far as Fort Benton, Montana, and all the traffic of the early settlers was brought by steamer to the trading posts along the river. With the more rapid transportation of the railroad this traffic dwindled away until it has almost disappeared

The Missouri River near Bismarck. (Photo by Russell Reid)

The Soil of the Missouri Plateau is of Two Kinds

There are two types of soil in the region west of the Missouri River, the "drift soil" and the "weathered soil," as distinguished by their different origin. As we have seen, a strip of territory some ten to thirty miles wide extending along the western bank of the river from the Montana to the South Dakota lines was once occupied by the first of the two great ice sheets which covered the land with drift or glacial waste. In this long, narrow region the soil is "drift soil" and is similar to the soil east of the river on the drift plain. It is mostly sandy loam, clay loam and silt. It is very fertile and easily tilled where the surface is not too rough. Gradually, almost imperceptably, this district, with its glaciated soil, shades off to the south and west into the unglaciated part of the plateau.

The soil of the unglaciated part consists of the weathered or decomposed rock layers deposited by the ocean when it covered the central part of the continent. These rocks are limestone, sandstone, shale and clay rock, deposited on the ocean bottom in the form of lime, sand, mud and clay, and compressed into rock by the weight of the ocean. Since then the water, air and frost have decomposed these rocks into the present soil. On the surface are several inches of black loam produced by the rotting of grass, weeds and trees.

Fortunately this soil contains the chemical ingredients needed for agriculture. It produces practically all kinds of farm crops in abundance. Since the rainfall of this region is rather light and uncertain for general agriculture. and since, in the southwest portion, the frost free season is often too short for corn and flax, grazing has been the chief industry. These vast, rolling plains, covered with a heavy growth of buffalo grass, have made an ideal cattle range from the time just following the Indian war of 1876 to recent years.

(Courtesy of N. P. Ry.)

A farm scene on the Missouri Plateau.

CHAPTER V

THE FIRST EXPLORERS AND WHAT THEY FOUND HERE

The Fur Traders

It was the search for furs which brought the first white men as far west as North Dakota. While the English were settling along the Atlantic coast the French fur traders who made their winter homes in Montreal followed the rivers and Indian trails through the dense forests of Canada far west of the Great Lakes in search of new and richer trapping grounds. With them came the zealous Jesuit priests, ever eager to convert more heathen Indians to their faith.

The first of these adventurers to come west of the Great Lakes was Pierre Radisson, a young man only eighteen years old, who came as far west as the Mississippi River in 1659 in company with his brother-in-law, Groseillers. Inducing several bands of Huron Indians to hunt beavers for him all winter and then persuading them to take the skins back to Montreal the next spring, young Radisson made a fortune of $50,000 that first year. He afterwards founded the Hudson Bay Fur Company, which became a great force in the development of western Canada, and is still doing a thriving business there.

Another young French adventurer, Greyselon Du Lhut, after whom the city of Duluth was named, came to the western end of Lake Superior in 1679 and developed an immense fur trade in northern Minnesota. It was he who discovered the great copper mines on the southern shore of the lake where Calumet and Houghton are now situated, and he it was who, single-handed, rescued Father Hennepin from the Sioux at Mille Lac Lake.

Pierre Verendrye Was First White Man

Among the early trader-explorers was a French nobleman named Pierre Verendrye,* who came west by way of the Great Lakes in 1734 and established many fur trading posts in northern Minnesota and southern Manitoba. In 1738 he made a journey from his post on the Assiniboine River, some distance west of Wninipeg, to the Hidatsa villages near the Missouri River in this state, hoping to learn from them the way to the Pacific Ocean. So far as we know this was the first journey made by a white man into what is now the state of North Dakota.

Verendrye's Sons

In 1742 Verendrye's two sons, Francois and Pierre, followed their father's route to the Hidatsa villages and went on toward the southwest in search of a way to the Pacific. They were unable to reach their goal because of a war between the Snake Indians and their neighbors, and the two brothers, greatly disappointed, returned to their trading station on the Assiniboine the next year.

There has been considerable dispute as to the extent of this expedition but it is quite certain that they went to the southwest as far as the Black Hills, perhaps as far as the Bighorn Mountains in Wyoming. While the Verendryes failed in their quest, their courageous attempt was praiseworthy and should give them a place in our memory as the first explorers of this state.

In the first years of the last century, Alexander Henry, a representative of the Northwest Fur Company, came into the northeastern part of the state and established fur trading posts at Pembina, Walhalla, Grand Forks, and at the mouth of the Park River. From 1801 to 1808 he carried on an extensive trade, mostly with the Chippeways. He made many journeys to different parts of the state, the Turtle Mountains, Devils Lake, and to the Sheyenne, James and Missouri rivers, and has left us in his journal valuable notes on the Indians and animals of the state and the progress of the fur trade at that time.

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*Note. His full name is Pierre Gaultier de Varennes Sieur de la Verendrye.

The Spanish

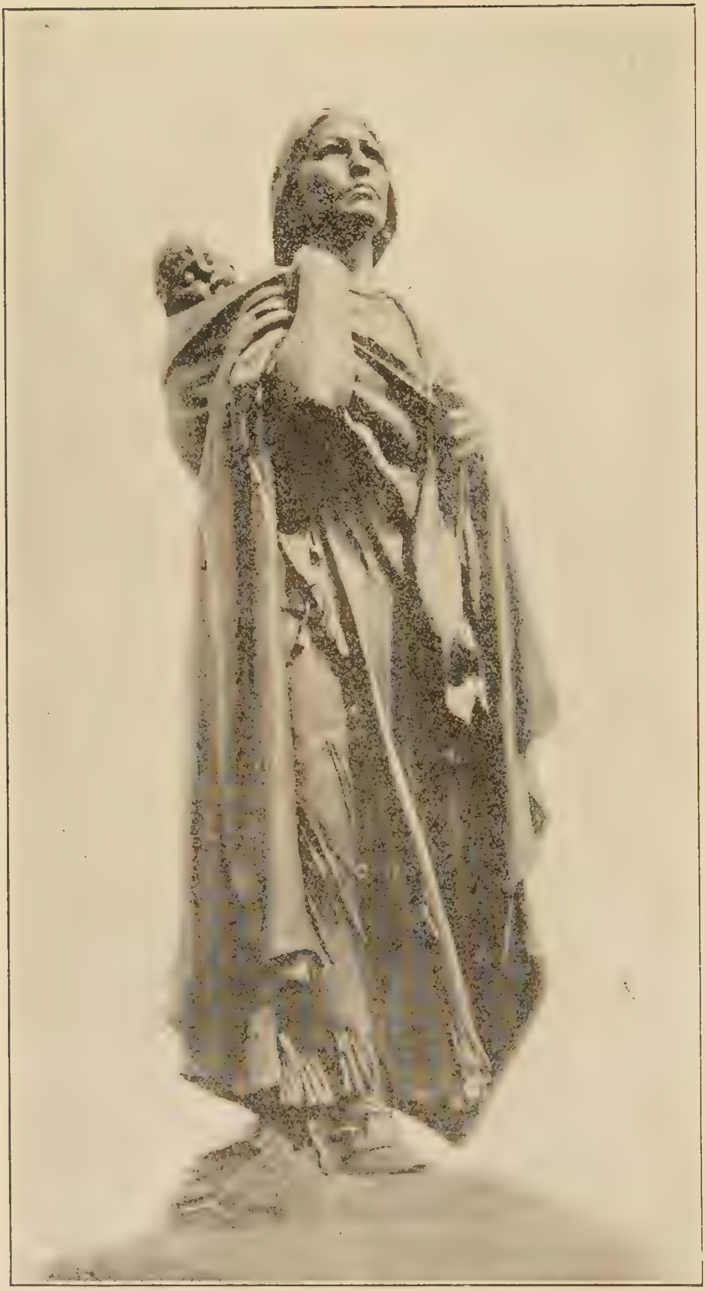
By this time a number of Spanish traders had made their way up the Missouri to the Mandan villages and some had even established posts on the Yellowstone, but their efforts were scattering and they had little or no permanent influence upon the development of the state.

The Louisiana Purchase Included Part of North Dakota

In 1803, Napoleon, the emperor of France, sold to the United States all the territory between the Mississippi River and the Rocky Mountains. This territory, then called Louisiana, included all the land between the Mississippi and the Rocky Mountains "which was drained by the Mississippi and its branches." This included the southwestern half of North Dakota, drained as it is by the Missouri and the James rivers, but did not include the northeastern half, which is drained into the Hudson Bay by the Red, Sheyenne and Mouse rivers and their branches. It is evident, then, from these facts that the southwestern half of our state was acquired by purchase from France in 1803. The northeastern half was acquired from England in 1818 by a treaty which established the 40th parallel, the present northern boundary of North Dakota, as the boundary between the United States and Canada. The dividing line between these two sections of the state, so differently acquired, is the height of land which divides the Sheyenne from the James and the Mouse from the Missouri rivers. Find this dividing line on the map.

Lewis and Clark Explored the Missouri River

The purchase of Louisiana was a wonderful diplomatic victory for President Jefferson and James Monroe, our minister at Paris, who conducted the purchase, and should



The statue of Sakakawea on the capitol grounds at Bismarck.

endear those great men to all future generations of Americans. As soon as the purchase was completed President Jefferson sent Captain Meriwether Lewis, his secretary, and Captain William Clark, an experienced western woodsman, to explore the new country by way of the Missouri River, and, if possible, to find a way through to the Pacific Ocean.

These explorers, with a number of soldiers, came up the Missouri River into North Dakota in the fall of 1804. They built a fort on the north bank of the river fourteen miles above the present site of Washburn, and spent the winter there. During the winter months they captured and killed many varieties of animals and birds. In the spring they sent a large boat load of these specimens, some alive and some stuffed, back to President Jefferson, in order that he might know what kind of wild life was found in this prairie country.

It was in this state, in one of the Hidatsa villages, that they found the Shoshone Indian girl, Sakakawea, who so skillfully guided them westward, even saving the lives of the whole party three different times.

The expedition, successful in every respect, returned down the Missouri River in the fall of 1806, having completed one of the most remarkable and important overland expeditions of all history. Besides exploring the northern part of the Louisiana Territory, they had found their way through the fastnesses of the Rocky Mountains to the ocean, giving the United States its chief claim to the Oregon country, from which we have made the three great states of Washington, Oregon and Idaho.

Some Great Scientists Came Here

In 1833 the first steamboat made its way up the Missouri River as far as North Dakota. This was the side-wheeler "Yellowstone", and on it came two distinguished visitors, George Catlin, the famous painter of primitive life, and Maximilian, the Prince of Weid, a German scientist, who brought with him another artist, Charles Bodmer.

Fur trading at Fort Union in the early days. (Courtesy of G. N. Ry.)

These scholars spent a year at Fort Union and other posts on the Missouri River, studying the Indians, the animals and the plants of that region. They have left us a large number of invaluable paintings and descriptions which have enabled us to know the life of that time.

Ten years later, in 1843, John James Audubon spent a season at Fort Union and vicinity studying the plants and animals of that region. He, too, has left us very valuable information concerning the life of that region a century ago.

However, it was another generation before the white settlers came into the Missouri valley to build permanent villages and homes. The Indians and the fur traders, with the great numbers of buffaloes, elk, antelope, and wolves, occupied that region until, after the Indian wars, the first railroad, the Northern Pacific, was built through to Bismarck in the early seventies.

CHAPTER VI

HOW OUR STATE WAS TAKEN FROM THE INDIANS AND SETTLED BY WHITE PEOPLE

Pembina Was the First Settlement

It happened that the first permanent settlement in North Dakota was made in the very northeastern corner of the state at the junction of the Pembina and Red rivers. It was a group of Scotch peasants who settled there in 1812, driven from their homes in Scotland by the heartless land laws of the time.

Lord Selkirk, an English nobleman, secured a large grant of land in western Canada, called Manitoba, and sent several ship loads of the homeless peasants there by way of the Hudson Bay and Nelson River. A group of these peasants settled Winnipeg in 1812 and some of them came up the Red River and made a settlement at the mouth of the Pembina, which was then British territory.

As we have seen, the 49th parallel was fixed upon as the boundary between the United States and Canada in 1818, which left Pembina on the south side of the line and made it the first permanent settlement in North Dakota.

These early settlers, besides engaging in the fur trade, began to farm the land and raised good crops of potatoes, wheat and beans. But life was hard for them, so far from other civilized settlements. There was no market for their crops. The nearest American settlement, aside from Winnipeg, was Chicago, and that was then only a group of log buildings, no larger than Pembina. Besides, they had some trouble with the Indians and still more with their white neighbors. For these reasons Pembina did not grow, and we have to wait for the coming of the Northern Pacific

Railroad in 1871 to see the first substantial settlement of the state.

The Indian Wars

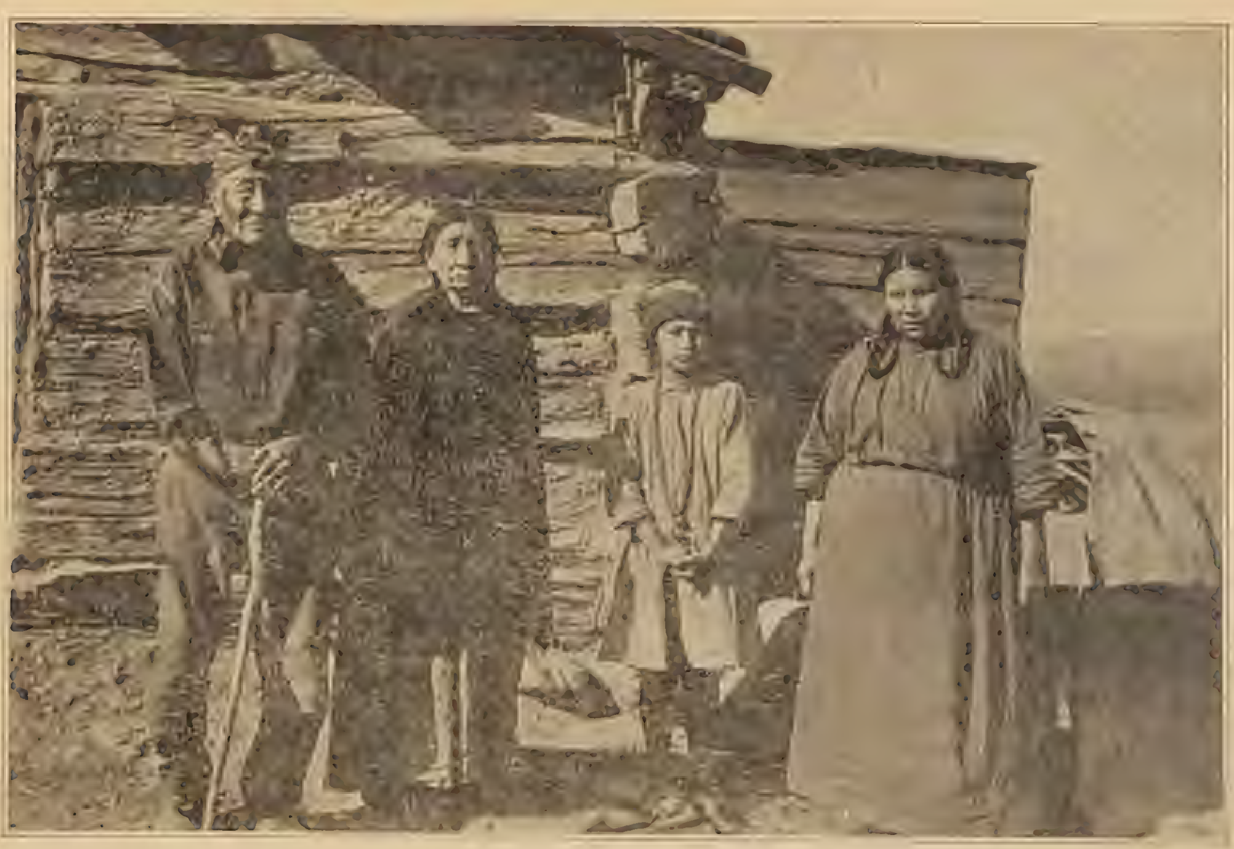
In the meantime many things were destined to happen. In 1862 several tribes of Santee Sioux, led by Little Crow, perpetrated that most terrible outrage called the Minnesota Massacre, in which they killed more than 1,000 settlers in the valley of the Minnesota River in a period of two weeks.

General H. H. Sibley finally drove Little Crow from Minnesota, and the next year pursued him and his followers up the Sheyenne valley and westward across the Missouri River, defeating them in three battles at Big Mound, Dead Buffalo Lake and Stony Lake in the central part of what is now North Dakota.

At the same time General Alfred Sully came up the Missouri River to cooperate with General Sibley's forces. Because of low water in the river he failed to meet General Sibley but found a large camp of Sioux at Whitestone Hill and inflicted upon them a crushing defeat. As a result of these two movements the Santees were driven west of the Missouri River and all of their lands, which extended as far west as the Missouri, were seized by the government.

The Treaty of 1868

In 1868 a treaty was made with the Teton Sioux, the seven tribes who lived west of the Missouri River, providing that they would be left in undisturbed possession of the country west of the Missouri in the western part of North and South Dakota. However, the discovery of gold in the Black Hills in 1875 and the consequent rush of the whites thither violated the treaty and brought on the wars of 1876. In this bloody struggle, in which General Custer and his Seventh Cavalry lost their lives, the Tetons were compelled to surrender their lands and live on reservations. This gave the government all the territory west to the Rocky Mountains and opened this northern region to settlement.



(Photo by Russell Reid)

Sioux Indians on the Standing Rock Reservation. Mr. and Mrs. White Lightning, their daughter in law and granddaughter.

Building the Northern Pacific Railroad

It was the building of the Northern Pacific Railroad which led to the rapid settlement of the state in the seventies and eighties. The road was built westward from Duluth, entering North Dakota at Fargo on New Year's Day, 1871. It reached the Missouri River at Bismarck two years later.

To help the railroad company in its great work the government had given it an immense grant of land, consisting of every other section for forty miles on both sides of the road all the way from the twin cities to the Pacific coast. This was a fortunate provision, for the company failed in 1873 and the land reverted to the stockholders.

The owners of this land then began to farm it, or sold it to those who would. The first crops were excellent and showed the remarkable fertility of the soil. Settlers then began to come into the state by the train loads and buy the railroad land or take homesteads. Villages sprang up, county governments were organized, roads were built, and in a decade the southeastern quarter of the state was pretty well settled. It was during this time that the large farms such as the Dalrymple farm at Casselton, the Grandin farm in Traill county and the Nestor farm at Valley City appeared.

This settlement boom brought prosperity to the railroad and enabled it to extend its line through to the Pacific coast. And with the progress of the road the southwestern part of the state became settled.

The Great Northern Railroad Built

Before the Northern Pacific Railroad was completed the Great Northern Railroad extended its lines from Breckenridge down the Red River Valley to Winnipeg, from Grand Forks to Duluth, and then from Grand Forks westward through the northern part of the state and on to the Pacific. With the building of this road, with its numerous branches, the northern half of the state was soon settled, and thriving towns grew up at Grand Forks, Devils Lake, Minot, and Williston.

The Soo and the Milwaukee

In 1893 the Minneapolis, St. Paul and Sault Ste. Marie Railroad was built from the southeastern corner of the state at Wahpeton to the northwestern part at Portal. Thence it was built on through the Canadian Rockies to the Pacific. This road, popularly known as the Soo, is a part of the Canadian Pacific system. It has been a great help in the development of the central part of our state.

In 1910 the Milwaukee extended a line through the very southwestern part of the state, from the Missouri River at Mobridge, South Dakota, to the Yellowstone River at Terry, Montana, thus helping to develop the southern tier of counties west of the Missouri.

These three main lines of trans-continental railroads effected a very rapid development of the whole state, and, in a generation, the almost trackless prairies became a well-peopled farming country. The great herds of buffalo and elk were killed off. With them went the countless antelope, wolves, foxes and beavers. Within half a lifetime the primitive prairie had given place to a prosperous farming region.

Some Pioneer Industries

With the settlement of the state the fur trade disappeared as an organized business. The fur trading posts were abandoned and have since fallen in ruins.

For a time the pioneers made ready money by gathering buffalo and elk bones and shipping them to eastern markets, where they were ground up and used in refining sugar.

The western part of the state developed into a cattle country. Large herds were developed and turned loose to range upon the unfenced plains, to be "rounded up" and "cut out" for shipment at marketing time. Coal mines were opened up all over the western half of the state and

"North Dakota lignite" became a great factor in the development of that section. The northern and eastern parts of the state were given over to the raising of grain and became the most important hard wheat region of this continent. Each of these industries will be described more in detail farther on in this book.

North Dakota Became a State in 1889

Dakota Territory, including what is now North and South Dakota, was organized in 1868. The capital was at Yankton, in the very southeastern corner. In 1883 the capital was moved to Bismarck. As the population increased it seemed to be desirable to divide the territory into two states rather than to leave it as one very large one. After repeated failures an enabling act was finally passed by congress February 22, 1889, providing for the admission of these two states, and some others, into the Union. A constitutional convention met at Bismarck that summer and drew up a constitution which was approved by the people. Thereupon the state of North Dakota was legally organized and was admitted to the Union November 2, 1889.

The history of the state is recorded in several published histories. It has been the purpose of this chapter to give only a brief summary. We should now see the nature of the people who settled here.

CHAPTER VII

OUR PEOPLE AND WHERE THEY CAME FROM

The Test of Civilization

The most important asset a state can have is the people who inhabit it. They, even more than the resources, the climate or the soil, determine its future—its place in the world. Many nations rich in gold, timber lands, soil and climate still lie in a backward condition, because of the lethargy of the people. Other nations have developed their resources only to squander them in wars and dissipation. The test of real civilization is the ability and ambition of a people to develop their resources and to use the wealth for better living and for the good of humanity. Few peoples have been able to meet this test with any degree of success.

The People of Europe

Even in ancient times the people of Europe reached a high state of civilization, much above that of their neighbors in Asia and Africa. The Latin peoples who settled southern Europe, the countries along the Mediterranean Sea, developed the civilization which we know as Greece and Rome, only to dissipate their lives and fall again, amid the ruins of their ancient temples and palaces. The present countries of Italy, Greece and Spain have been built by their descendants upon the ruins of their former splendor.

Centuries later the Anglo-Saxon people of northern Europe developed the modern states of Germany, England, Scotland, Ireland, Wales, Norway, Sweden, and Denmark. A small branch of these people, the Franks, mixed with the Latin peoples of the south and developed what we now call France. The Russians are an Asiatic people who early came west, but who have been very slow to give up their oriental ways and take on western civilization. The people of southeastern Europe are a mixture of Latin, German and Russian, but are dominated more by the Latin influence.

Our Immigrants

The original thirteen colonies were settled almost entirely by the people of northern Europe, the English, Germans, Dutch, and Swedes. The English had a large majority in all of the colonies except New York, which was mostly Dutch. From that time, until a generation ago, practically all of our immigrants have come from northern Europe. Since 1890, however, our immigration has come mostly from southern Europe, principally from Italy and Greece.

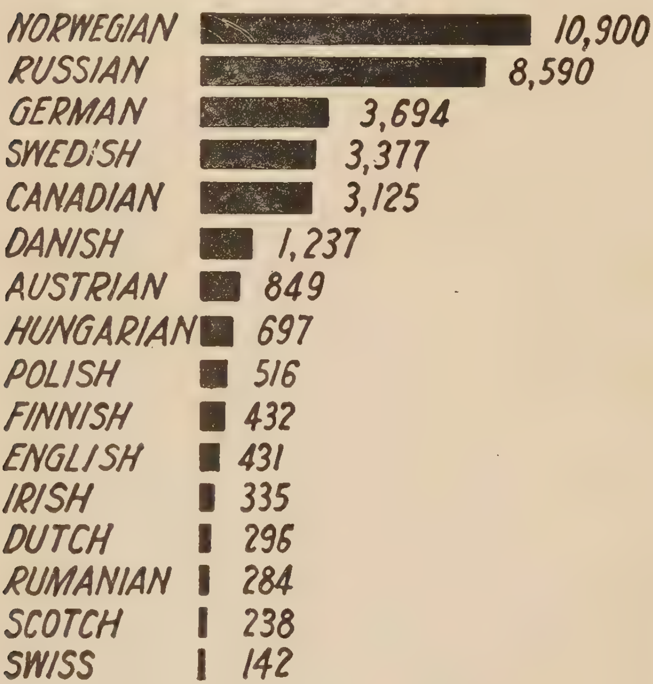
The Influence of the English

The fact that the colonies were settled mainly by the English has made the United States an English speaking nation with English customs. From the English people we have obtained our language, our system of laws, our literature, our principles of government and our constitutional rights, and, for the most part, our industrial system, our social life and our religion. Other nationalities have established their customs in certain localities and have influenced the whole nation in some ways.

The Characteristics of Northern Europeans

We in North Dakota have been very fortunate in having our people made up almost entirely of northern European stock. These people are large, fair and healthy, being free from the many contagious diseases so common among the peoples of southern Europe. These northern people have a highly developed character, a fine sense of justice and their spirit of individual rights and privileges is strong. They are industrious, ambitious and hard-working, and most of the common people learn a trade and engage in some established industry. Our immigrants from northern Europe have shown a high degree of literacy, as compared with those from the southern countries. Their standard of living is higher and they show a finer respect for women and family relationships. Crime among them is slight, drunkenness or other dissipation is not marked, and divorce and desertion are not frequent. They are given to charity, the founding of many poor houses, almshouses, hospitals and homes for the blind, the deaf and the crippled.

It was from these people, almost entirely, that the inhabitants of North Dakota sprang, which gives us the very finest type of population.



(Courtesy of N. P. Ry.)

This graph shows the number of foreign born farmers of various nationalities in this state. Notice that nearly all are from northern Europe.

Where the People of North Dakota Came From

For the most part North Dakota was settled by people from the adjoining states to the southeast, Minnesota, Wisconsin, Illinois, and Iowa, though practically all states have contributed somewhat to our population.

About sixty percent of the farmers now living in North Dakota were born in the United States. According to the 1920 census 41,442 North Dakota farmers were born in America; 36,248 in Europe. The other forty percent were born in Europe, mostly in Norway. Practically all of our foreign born population has come from northern Europe.

The accompanying graph shows that practically all of our immigrants have come from northern Europe. Notice the large percentage of Norwegians and Russians. We have only a slight sprinkling of Bulgarians, Roumanians, and Greeks. The 1920 census shows only twenty-six negro farmers and no Asiatics. There are something over five hundred Indian farmers in the state.

When we remember the superior characteristics of the people of northern Europe we can be proud of our North Dakota people. Physically, intellectually and morally they stand among the best. They are ambitious, hard working and frugal. They are reliable and honest. They believe in the church and the school and have a high respect for law. North Dakota's greatest asset is the quality of its people.

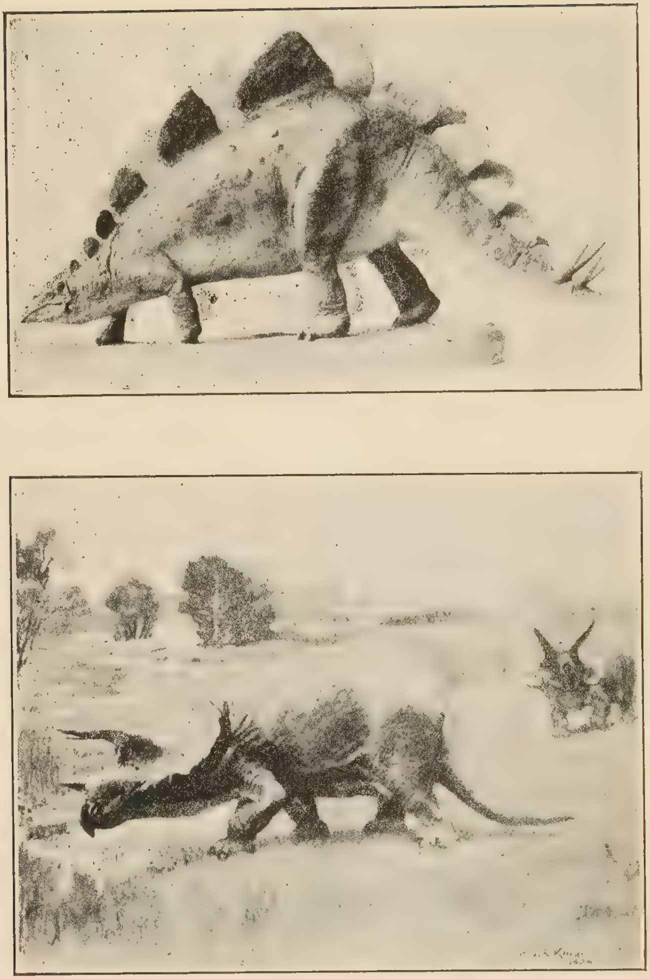
The Characteristics of Our North Dakota Population

An examination of the census reports reveals some interesting facts concerning the people of North Dakota. About three-fourths were born in the United States, many of them, however, of foreign-born parents. About one-fourth were born in Europe.

There are more men than women in the state. In the country districts there are 122 men to every 100 women. In the cities and larger towns there are 115 men to 100 women.

Of the country children from 6 to 14 years of age 80 percent attend school; of the city and village children, 84 percent attend. The girls attend a little better than the boys in both the city and the country.

A person who cannot read or write is called illiterate. Of our white population born in this country, only one-half of one percent (one out of every two hundred) is illiterate. Of the foreign-born whites six percent are illiterate. There are about 7,000 Indians in the state. Only a few more than half of them can read and write, and they are the young people and children who have had advantage of our schools. As a rule the older Indians cannot speak or write our language.



Prehistoric animals which once roamed these plains.

CHAPTER VIII

THE GREAT ANIMALS THAT ONCE LIVED IN NORTH DAKOTA

The Great Variety of Animals

The native wild animals of the state constitute a wide variety of species from the grizzly bear and buffalo to the gopher and field mouse. The largest and most ferocious beasts found on the American continent once lived in this state, some of them in immense numbers. The larger animals were the buffalo, grizzly bear, black bear, moose, elk and deer. These have disappeared, except for a few deer which still occupy the timbered regions in the hills and the river bottoms. There were also lynx, mountain lions, antelope, mountain sheep, wolves and coyotes. Of these the coyotes alone remains to any extent, the antelope, mountain sheep and wolves being seen very rarely.

The state was at one time a fur trader's paradise. The first white men to come here came for the skins of the bear, fox, beaver, otter, mink, skunk and badger, which were very numerous. Every summer they came from the east in their canoes by way of the Great Lakes, purchased the furs which the Indians had collected during the winter and in the fall took them back to Montreal to be shipped to the world's fur market at Paris.

Wild fowl, especially ducks, geese and prairie chickens lived on these plains by the millions. Though they never became commercially important they furnished food to the Indians and early settlers. The Red, Sheyenne, James, and Missouri rivers are still famous bird ways, notěd for the number and variety of song birds that either nest in or pass through their timbered valleys.

Fish once furnished an important food supply. Countless small animals, such as prairie dogs, squirrels, gophers, cottontail, Jack and snowshoe rabbits still remain and furnish many problems for the farmers.

Each of these groups of wild life are important enough for us to study more in detail.

Buffalo

Before the coming of the white man the American bison, or buffalo, roamed these plains in immense numbers. Some herds were miles in extent. One traveler states that in going from Grand Forks to the Turtle Mountains, a distance of two hundred miles, he was never out of sight of a great herd of these animals. A stampede of them entirely demolished Alexander Henry's log fort at the mouth of the Park River about the year 1800, and Captain Grant Marsh, a Missouri River pilot, states that his steamer, the "Ida Stockdale", was entirely blocked in the midst of the Missouri River by a herd of buffaloes as they swam across the river. From these statements we can judge their immense numbers.

(U. S. Biological Survey)

Buffaloes grazing on the plains.

Early Importance of the Buffalo

The Sioux Indians practically lived upon the buffalo, supplementing their meat diet only by the wild fruits and berries and by the corn and vegetables which they could steal from the Mandans and other agricultural tribes who lived along the Missouri.*

The flesh of the buffalo furnished them with food. The hides made their tepee homes, bedding, carpets, heavy clothing, shields and lassos. The bones were made into hoes, clubs, flesh scrapers, spoons, ladles and ornaments. The hoofs provided glue and the sinew was used for bow-cords. The Indians could not have lived on these plains without the buffalo.

Reasons for Extermination

There is a popular belief that the Indians killed the buffalo only as they needed meat—that it was the greed of the white man that finally exterminated them. This is not true. The white men were bad enough, killing them in large numbers, even after they became scarce, but the Indians were much worse. They killed them by the thousands, for the mere sport of killing, without taking either hides or meat. Had not the white man killed a single buffalo, the Indians, with the white man's gun, would have exterminated them before the present time.

The Shipping of Buffalo Bones

When the first pioneers came and built their sod houses and tarpaper shacks on their claims, the plains were strewn with buffalo bones bleaching in the sun. They were gathered up and shipped by the train load to the eastern cities where they were used in the process of refining sugar. This industry became an important one and kept many a pioneer from starving.

The buffalo has now disappeared as a wild animal. It is raised in herds in some western states, and its meat may be purchased in the city markets, but it no longer ranges at large over the great western plains.

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*Note. The Indians were especially fond of the buffalo's tongue and of the meat found in his hump.

Moose

It is not probable that moose were ever very plentiful in North Dakota. They love the dense forests, lakes and swamps such as are found in northern Minnesota. Their long legs and large feet make it easy for them to wade the swamps and swim the lakes. They avoid the open plains.

Alexander Henry, a famous fur trader who had many fur trading posts in this state over a century ago, says in his journal that he frequently found moose in the Red River Valley about the mouth of the Park River. He also says that the Pembina Mountains were a good place for moose.

This great forest animal has been found occasionally in the Turtle Mountains in more recent years, one as late as 1898. The undrained forests of that locality make an ideal place for them. The Indians say they used to find moose in the hills south of Devils Lake. Several have been killed in the lower Red River Valley since 1900. A cow moose was captured in Sargent County in 1913.

There are several places in the state where moose could be raised successfully, especially in the Turtle Mountains. They are so large and such fierce fighters that they have no natural enemies they cannot overcome. They live on the twigs of bushes and small trees found in swamps and along streams. They raise one or two young each year.

Elk

Next to the buffalo the elk was the most numerous of the large animals of North Dakota. Immense herds of them fed on these plains in the summer and "browsed" in the timbered river valleys in the winter. When Alexander Henry came up the Red River in 1800 he wrote in his journal under date of September 5th, "Large herds (of elk) were seen at every turn of the river and the bulls were bugling all through the woods." Lewis and Clark mention having seen three herds from one point near Fort Rice and large numbers of them on the wide river bottoms south of

Bismarck. Many other herds were seen by them on their way up the Missouri River.

North Dakota was an ideal home for elk. They fed on the buffalo grass in the summer. In winter they went into the thickly timbered river bottoms and fed upon the twigs of bushes and trees. Here they shed their horns every spring, leaving them scattered through the brush by the thousands. They didn't mind the cold winters, well sheltered and well fed as they were in the timber.

The Indians hunted elk in the river bottoms through the winter, using their flesh for food and their tough hides for moccasins. The women prized the teeth as ornaments, but the men wore necklaces of bears' claws, spurning the common elk teeth as feminine baubles. Today elks' teeth are scarce and have become valuable as watch charms, an emblem of membership in the Brotherhood of Elks.

(U. S. Biological Survey)

Two bull elk at peace on a game preserve.

While the Indians lived largely upon the elk in the winter they did not exterminate them or even decrease their numbers. The large herds remained until the rapid settlement of the state began about 1880. At that time the elk were rapidly killed off or driven out of the state.

Theodore Roosevelt, who was ranching in the Badlands at that time, says in his interesting book, "Ranching in the Badlands": "I have occasionally killed elk in the neighborhood of my ranch on the Little Missouri. They were very plentiful along this river until 1881, but the last of the big bands were slaughtered or scattered about that time." In another place he tells us why he named his ranch the "Elkhorn": "Sometimes, but rarely, fighting wapiti (elk) get their antlers interlocked and perish miserably; my own ranch, the Elkhorn, was named from finding on the spot where the ranch house now stands two splendid pairs of elk antlers thus interlocked."

Elk Ranching as a Business

Elk ranching gives promise of a possible profitable industry in this state. The North Dakota biological survey describes the possibility thus: "In domestication, elk have proved more hardy and prolific than other stock and almost as easily handled under well-fenced range. If in the future the production of elk meat proves as profitable an industry as it promises, there will be found ideal conditions for elk pastures in many parts of western North Dakota, where rough and steep slopes lie close to brushy bottomlands, and winter browse and summer grass can be inclosed in a single or adjoining areas. The severe winter weather which means suffering and loss to domestic stock without shelter is a joy to these native born and bred deer, if a suitable and adequate food supply be available. Along many of the stream valleys with badland borders, which now lie idle or are of little use for stock, elk would find an abundance of their favorite food and choice living conditions. The time seems ripe for adding this industry to the many resources of the state."

It is the nature of deer to hide in dense thickets, coming out to feed only in the evening and early morning. They seldom show themselves in open places. For this reason North Dakota has not furnished them a suitable home and they have never lived here in large numbers. However, the timbered areas, especially the river bottoms, have contained some of both the mule deer and the white tail species, and even today a few are found in the Missouri bottoms and in the forest reserves in the Badlands. If these favorable areas were restocked and carefully protected there is no doubt that deer would thrive there. They are easily domesticated and can be raised in pastures with cattle where the food is proper for their needs.

White-tailed deer from the Missouri Valley near Williston.

Their feeding habits differ materially from that of other larger animals. They do not like grass, except to taste the first green shoots of spring, nor do they browse the twigs and barks of the forest as readily as do the moose and elk. They live mostly on buds, acorns, pods and seeds of trees, and a large variety of weeds. This condition makes their food rather difficult to furnish in this state. However, on farms where there is access to timbered pasture, domestication is possible and should be profitable, because deer meat, venison, is an excellent food and is considered quite a luxury.

Antelope

Before the state was settled antelope were as plentiful as elk. They roamed over the whole state except the Red River Valley, which they probably avoided because of the lack of their favorite food. Since their habits were much like those of the elk, they loved the open country. They roamed the plains in summer and took to the sheltered ravines and wooded bottom lands for protection and food in winter. For this reason they took more readily to the western part of the state. They were very fond of buds, seeds and the tender shoots of bushes, which are more plentiful in the more broken areas of the western part.

Lewis and Clark saw large herds of antelope as they passed through the state, and tell of the Indians capturing a hundred in one trap, while the explorers were spending the winter at Camp Mandan. All early travelers speak of seeing them in large herds, except Alexander Henry, whose time was spent mostly in the Red River Valley.

The Great Antelope Pestilence

In 1873 a contagious disease spread among the antelope herds west of the Missouri River and nearly exterminated them. Probably four-fifths of the antelope of that area died that year. Travelers say they saw ten dead ones to every live one. This epidemic did not spread east of the Missouri River, but covered all the country from that river west to the Yellowstone.

The antelope seem to have recovered somewhat in the next decade. Ten years later Roosevelt wrote in his book, "The Wilderness Hunter", concerning the Badlands, "Antelope were very plentiful, running like race-horses across the level, or uttering their queer, barking grunt as they stood at gaze, the white hairs on their rumps all on end, their neck bands of broken brown and white vivid in the sunlight."

These graceful and beautiful animals, as pretty and as shy as deer, almost entirely disappeared during the rapid settlement of the state in the eighties, as did the elk. Only small numbers have been seen since that time, and those were mostly in the Badlands. It is estimated that there are probably not more than 250 in the state at the present time. The only hope of preserving this remnant is the establishment of a game preserve for them in the Badlands where land is of little value. A well selected feeding range in that region could be made to preserve not only the antelope, but the elk, deer and buffalo as well.

(Photo by H. W. Henshaw)
A buck antelope.

Brown Bear

In the early days both black and brown bear roamed the whole state in considerable numbers and could be said to be plentiful in the Red River Valley, and in the Pembina and Turtle Mountains. Alexander Henry took over 900 bear skins in that region in four years and he records the killing of fifteen bears in ten days. In his journal he complains of the damage they did to plum trees and oak trees in their search for fruit and nuts.

There were not many bears in the Badlands or in the valley of the Missouri or other rivers of the state. Only a few remain today. Occasionally one is killed in the Turtle Mountains or in the hills near Walhalla, or one may wander into the timber along the Red River from Minnesota.

The forest is the natural home of the bear, where they live on acorns, wild fruits, berries and wild honey. They sometimes wander long distances in search for these foods. They are hearty eaters and in the fall they gorge themselves on fruits and nuts to lay up a supply of fat for the long winter. When winter sets in they hibernate. They crawl into a hollow tree or log or dig a hole into the ground where they lie half asleep until spring. During this time they do not eat, but are sustained by the extra fat they stored up by overeating in the fall. It is only during this period of hibernation that the fur is in prime condition. It is useless when taken too early in the fall or too late in the spring.

Grizzly Bear

Grizzly bears were not as plentiful as the black and brown variety but were common in the valleys of the Red and Sheyenne rivers and in the Pembina and Turtle Mountains. They were also quite plentiful along the Missouri River. Early travelers tell us of grizzlies killed there nine feet long and weighing 600 pounds, and of tracks eight inches wide and fourteen inches long. Lewis and Clark saw many grizzlies and killed some.

John James Audubon, the famous scientist, spent the summer of 1843 along the Missouri River in this state. He saw many grizzly bears, and tells the story of a man at Fort Union, who, while picking peas in his garden, happened to look up and saw a large grizzly picking peas at the other end of the row. The man fled for help and returned later with several armed men, to find the bear eating peas from his bucket. The bear paid no attention to the men and was shot.

Grizzly bears were the most ferocious animals on this continent. They usually fed upon berries, fruits and acorns, but sometimes killed and ate buffalo. They were so savage and hard to kill that the Indians did not attack them except in large parties, and then often sacrificed several of their number to the wrath of the great beast. Even with modern rifles hunters attacked them very cautiously and depended for their lives upon quick and accurate shooting. A grizzly would often attack men without provocation, with a swift and terrible charge, and nothing but a bullet through the brain of the beast would stop him. Being shot through the fleshy parts of the body only seemed to anger him.

The grizzly bear has entirely disappeared from the state. For the sake of the stock on our large ranches it was necessary to exterminate such an unmanageable beast.

Wolves and Coyotes

Both wolves and coyotes, or prairie wolves, were very numerous over the entire length and breadth of the state, where they followed the large herds of buffalo, elk and antelope, feeding upon the dead or attacking those that fell behind. Early travelers say that no sooner was an animal shot and skinned than numerous wolves came from all directions to devour the carcass. At night they would sit on the hilltops about the forts and camps and keep up an incessant howling. In winter hunger made them so bold that they would come into the camps and villages, even into the tents of campers, and attack unprotected persons.

The habits of wolves and coyotes are very similar. They live in holes or dens in hillsides, either in open or timbered country, while their young are small. The young are usually born in March, from six to twelve in a litter. The parents watch the den carefully, one of them ranging for food at a time, until July, when the young are half grown and considered old enough to hunt with their parents.

This family constituted what is called a "pack" of wolves, and, led by the father, went together in search of food. Sometimes, in dire need of food, they joined with other families in order to attack larger animals with greater certainty of success.

The vast number of wolves was reduced to a scattering remnant by the time of rapid settlement in the eighties. There were two reasons for this rapid disappearance of such a crafty animal. The disappearance of the buffalo, elk and antelope at that time removed their principal food supply. Also, the early settlers were obliged to kill them off in order to protect their cattle and sheep. They were poisoned by the tens of thousands. One settler tells of poisoning seven hundred wolves in the hills south of Devils Lake in one winter. Hunters dug them out of their holes or "smoked" them to death within. Every county gave a reward, called a bounty, for each wolf killed, and every

A prairie wolf.

known means of extermination was used to get rid of them.

At the present time only a few wolves remain, and those are in the broken, hilly regions where it is difficult to hunt them or to find their dens. The coyotes, or prairie wolves, are still quite common and take their toll of sheep, calves and domestic fowl every year. Yet they are by no means as destructive as their larger cousins, the gray wolves. It is a matter of record that one wolf killed 125 head of cattle in ten months. One wolf in Custer County, South Dakota, killed $25,000 worth of cattle in seven years. It is not to be regretted that an animal so destructive to stock raising should be exterminated.

Mountain Sheep

Mountain sheep, popularly called "Bighorns" and spoken of by some early travelers as goats, were once quite common in the Badlands and along the bluffs of the upper Missouri. Roosevelt and Howard Eaton tell of killing some in the Badlands in the early eighties. They were often seen standing on the top of some butte or ridge in the roughest kind of country, but they were wary and difficult to approach within rifle shot.

There are no more mountain sheep to be found in the state. One was killed near the Killdeer Mountains in 1905 and there is no record of one having been taken or seen since. They were unable to protect themselves from the countless wolves. Their heads, with their heavy, spiral horns made a tempting trophy for the hunter. The wolf and the hunter together exterminated this harmless and noble animal.

CHAPTER IX

OUR FUR-BEARING ANIMALS

The Fur Trade of Early Days

North Dakota was a fur hunter's paradise. The first explorers and travelers were fur traders who came from eastern Canada in search of beaver, otter, mink, bear and fox. They established fur-trading posts or "forts" along the principal rivers and offered every inducement to the Indians to hunt and trap fur-bearing animals, especially beaver, and bring the hides to the fort to trade for guns, knives, axes, beads, cloth, tobacco and whiskey.

So profitable was this business that great companies were formed, such as the Hudson Bay Fur Company, the Northwestern Fur Company, the Missouri Fur Company, and the American Fur Company. These companies sent their best agents into this region. Among them were such men as Alexander Henry, Manuel Lisa, Captain James Kipp, and Kenneth McKenzie. These strong men of the west covered every nook and corner of the state in their search for furs. They and their parties of traders ruled both white man and red with an iron hand, and woe to him who dared to cross their paths.

This fur-trading business is well described in the various histories of our state. Let us look now at the nature and habits of the fur-bearing animals for which they spent so much time, labor, wealth and human lives to secure.

The Beaver

The most desirable of the fur bearing animals was the beaver. There were two distinct types in this state, the Canadian beaver and the Missouri beaver. As the names indicate these two species occupied different regions. The former were found in those streams which are a part of the Red River system, the Red, the Mouse, the Sheyenne and their tributaries. The latter were found in the Missouri and its branches.

The Canadian beaver are strong animals, with large, webbed hind feet and a broad, hairless, paddle-like tail. They usually weigh about fifty pounds. Their fur is heavy, and especially thick next to the body. It is dark brown in color and very glossy. Their teeth are large and chisel-like, well fitted for gnawing trees. The Missouri beaver is smaller and about ten or fifteen pounds lighter. Its fur is lighter brown, shading to a gray underneath the body.

Beaver were at one time very plentiful in practically all streams of the state. Alexander Henry took more than 7,000 from the Red River and its branches in the first eight years of the last century. During the year of 1833 more than 25,000 skins were bought at the single trading post of Fort Union on the Missouri River.

Skinning the beaver properly was an important matter. To remove the hide it was cut from one hind leg to the other and pulled over the head. It was then scraped clean of all fat and stretched, inside out, over a round hoop about the size of a barrel hoop. When dried, about seventy such skins constituted a trader's "pack" and weighed about one hundred pounds. The skins were worth about $7.00 each or $500.00 per pack. An individual trapper, with good luck, could make about $4,000 in a season, which he usually spent in riotous living in Montreal through the following winter.

At the present time there are a few beaver in the state, in scattered localities. They are protected by law. In some few places they are doing considerable damage to trees.

The Beaver Dams

The beaver builds dams in shallow streams in order to have water deep enough to dive in safely and to have a roomy swimming pool under the ice. These dams are built with a skill and constructive ability that seems almost human. To begin with they usually select a place where there is a large rock or other obstruction in midstream to which the dam can be anchored. Up stream from this point they gnaw down trees with their sharp teeth and float them down against the rock. There they pull the butt or heavy end of the tree down under water and push it into the mud, with the top extending up stream. Many trees are thus placed across the stream, and small trees and branches are floated down against them until a great, tangled mass of logs, branches, and leaves extends from bank to bank. Upon each piece, as it is put in place, the beavers pile mud with their shovel-like tails, working rapidly and busily until the river is entirely obstructed and the water backs up to a depth of six or eight feet, and sometimes for half a mile up stream.

In this process of dam building the beaver often cuts down trees as much as eight to ten inches in diameter, and sometimes cuts acres of them for this purpose, covering the ground with chips as large as would be made by a hatchet. Maximilian, the Prince of Wied, who spent a year on the Missouri River in this state in 1833 writes: "We lay for the night on the south bank (of the Missouri) where the forest was completely laid waste by the beavers. They had felled a number of large trees, chips of which had been scattered about the ground—in this manner a bare place was formed in the forest."

Many times they cut trees ten inches in diameter at a distance of several hundred feet from the water. These logs then have to be dragged to the water through the trees and stumps of their cuttings. This must be a hard task for those doughty little animals!

Beaver Lodges and Dens

It is very difficult to catch sight of beavers at work. As soon as men approach, they scurry into the water and all is quiet until long after the intruders have departed. Men who have succeeded in stalking up on them and watching them at work say that they always have a watchman placed on some stone or log. When danger approaches he alarms the village by beating the water violently with his tail. Then he and all the others plunge heavily into the water for safety.

The beaver has two kinds of dwellings. Sometimes he builds a lodge of mud and brush, like a muskrat lodge, and sometimes he lives in a den or network of burrows dug into the bank.

The lodge is built in the pond formed by the dam. Its foundation, under water, is built up of sticks and mud. The dome, which extends some three or four feet above the surface, is made of lighter branches, grass and leaves plastered into a solid mass with mud. The only entrance is from underneath the water. This entrance leads to comfortable nesting and living chambers above the water, from which the beaver can make a hurried exit to the water below in case the lodge is attacked. In this way he can enter or leave the house without being seen.

A beaver den consists of a network of channels in the bank above the water level with several entrances from beneath the water. When an entrance is so near the surface that it is in danger of freezing full of ice, beavers often protect it from freezing with a huge pile of sticks and mud. Far back in the bank, sometimes as much as a hundred feet, they make vent holes from their den up to the surface to give them ventilation. On a frosty day warm air can be seen steaming upward from these holes.

The Possibility of Beaver Ranching

Since the streams of North Dakota are a favorable feeding ground for beaver, as proved by their rapid multiplication in the past, it is evident that this is an excellent place to grow them for profit. The winding channels of the many streams of the Red River system, thickly set with poplar, cottonwood, willow, ash and birch, valueless as timber lands and in many places unfit for pasture, would furnish favorable feeding grounds and homes for countless beaver. Under careful protection beaver multiply in number rapidly, raising as they do from four to six young each year. Their fur is very valuable at the present time and shows every sign of becoming more so in the future. From these facts the raising of beaver for profit looms large as a possible future industry in North Dakota.

Otter

The otter has a slender body, a tapering and muscular tail, webbed feet, and a rich, dark brown fur. It weighs from twenty to twenty-five pounds. They were quite plentiful in this state before settlement. Though they were not as numerous as beaver, some 200 or 300 skins were often brought into a single trading post in a year. They are frequently found in the state at the present time.

Otter

Otter live in holes in the banks of streams and lakes where there are plenty of fish. They swim rapidly under the water or on the surface, where they catch fish and frogs for food. On dry land they move clumsily, but on the snow they move rapidly by quick jumps and long slides on their glossy bellies. This queer motion is called tobogganing.

They are fierce fighters, able to stand off almost any dog, and will kill dogs quickly if they can get them into the water. Their furs are a beautiful, glossy brown and quite valuable. A hide usually sells for about $25.00. They bear two to four young a year, but they are difficult to raise in captivity.

Mink

One of the craftiest little hunters of the stream is the mink. Much smaller than a cat, with a long, slender body, its movements are very stealthy and cat-like. Its fur is soft and rich, changing from a deep brown in winter, with usually a white patch on the neck, to a yellowish brown in summer. It is the terror of the muskrats, often eating holes in their lodges and killing whole families of them. Large numbers of muskrats sometimes vacate their native swamp in fear of a single mink. They also feed on rats, mice and waterfowl, and share with the skunk and the weasel the unsavory reputation of looting chicken roosts.

Mink are hard fighters and brutal killers. When cornered they will fight a dog savagely, and will throw at their enemies a fluid with an odor as disagreeable as that of the skunk.

Mr. Eastgate, the superintendent of the fish hatchery at Spiritwood Lake, reports having found a mink den at Sweetwater Lake containing "nine full-grown muskrats, four ducks, five coots, several smaller birds, some mice and one small jackrabbit that had been killed and brought in for food."

Mr. David H. Herman of Willows, North Dakota, reported to the biological survey in 1886 "that a mink killed all of his hens one night and the next night spent its time trying to climb up the sides of the house to get at those hung up from the previous night's kill. The third night he came back and killed the rooster, the only remaining bird of the flock." One of Mr. Herman's neighbors had fifty-one chickens killed in one night by a mink which they found in the hen house the next morning.

Mink are valuable for their fur. A pelt is now worth from $25.00 to $100.00. They have been domesticated successfully in other states, but only slightly as yet in North Dakota. The industry gives every promise of great success in this state.

Muskrat

The muskrat is so common and well known that it does not need description. It is the most numerous and most valuable fur bearing animal of both North Dakota and the nation. It is found in almost every stream, swamp and lake in the state and in some of them in immense numbers.

Muskrats build lodges very much like those of the beaver and often, if not usually, raise their young in holes in the banks. There are six or eight young in a litter, born in May, and by June they are swimming about. A second litter may be born in midsummer. They feed on cattails, roots, bulbs, water plants and use clams for their meat diet. They are very fond of carrots, turnips and parsnips, which therefore make excellent bait.

Muskrat Ranching

Muskrat farming or ranching is a well developed industry in the United States and could easily be developed extensively in North Dakota. The rats find excellent food conditions and multiply rapidly in nearly all the waters of the state. Many a farm has on it a lake or slough which, if well stocked, would, with little effort, produce more money than is taken from many cultivated fields by great labor. The muskrats take care of themselves, feed themselves on plants that are otherwise worthless, leaving only the skinning and marketing to be done by man. They have few natural enemies and are very prolific.

It is essential that the water selected for stocking should be deep enough to allow a large swimming space under the ice and holes must be kept open to furnish air. The grounds should be inclosed with special fencing to keep the rats from migrating and to keep out mink and other enemies. With only a few precautions and little care muskrat farming can be made a very profitable industry. The furs are always in demand at a good price.

Fox

Red foxes were once quite numerous in North Dakota and they are still to be found in broken country where there is some cover. They are seldom seen, for they do their hunting at night. During the day they remain in their dens or lie half asleep in some thicket with one eye on their back trail. They are very crafty and alert and it takes a good hunter to get one.

In habits of living the fox is similar to the coyote and wolf, except that the fox hunts alone, never in packs or in pairs. He feeds upon rabbits, gophers, mice and birds, and, in a settled country, preys upon domestic fowl.

The red fox is about the size of a spitz dog, slightly larger than a cat. It is slender and light, with erect ears, sharp nose and long, fluffy tail. It is of a reddish yellow color, with underparts gray, the tip of the tail always white, and the feet and ankles black. It is very quick and graceful in its movements.

Red fox fur is valuable. In recent years many fox farms have grown up. Most fox farmers, however, usually raise silver black foxes, for their fur is much more valuable. Foxes are not easy animals to raise in captivity. When disturbed or frightened they often eat their young or the young of others. They must be protected from dogs, even from the fear of them, and otherwise kept in a state of peace and security.

Other Fur-Bearing Animals

In addition to the fur-bearing animals discussed above there are many animals, not so numerous, which nevertheless furnish considerable valuable fur. Skunks, badgers, squirrels, jack, cottontail and snowshoe rabbits, weasels, or ermine, and cat are common and yield a total income to the state that is worth while.

A red fox

CHAPTER X

GAME, FISH AND SONG BIRDS

Ducks

Three types of wild fowl are plentiful in North Dakota, ducks, geese and prairie chickens. Ducks and prairie chickens are especially plentiful, and have made the state known as a hunter's paradise.

(Photo by Russell Reid)
A nest of canvasback ducks just hatching out.

The many sloughs and swamps make the state an ideal breeding and feeding place for ducks. Several varieties, principally the mallard, canvasback, red head, gray duck and pin-tail, are bred in the marshes by the millions. In the fall, when the sloughs freeze over and the snow covers the barley, wheat and corn fields, these birds go south for the winter. At the same time the millions bred in Canada pass southward over the state, stopping here to feed on their way, staying from a few days to two months, depending upon the nature of the weather. Through the open season, from September 17th to December 1st, the hunters hide among the rushes in the sloughs early in the morning and again before sunset to shoot the ducks as they go out and return from feeding in the fields.

Geese

Geese are not as plentiful as ducks and it is doubtful that any breed in the state. In the fall they stop to feed in their flight from their breeding grounds in Canada to their winter home in Texas.

Like most of the ducks they have their breeding grounds and summer feeding places in Canada and fly back and forth across this state in fall and spring, stopping to feed for some time in passage. They are hunted extensively in the fall, but hunting for either ducks or geese in their spring flight is not permitted.

Prairie Chickens

Large numbers of prairie chickens occupy nearly every part of the state and are extensively hunted for one month in the fall, beginning September 17th. They breed here and stay here the whole year, living on the open prairie and feeding in the stubble. Through the summer they may be seen in families or "coveys" of six to twelve. In the late fall, when the young are full grown, and colder weather comes on, they "bunch" into large flocks, and keep crafty watch for the hunter.

Grouse are very much like prairie chickens but are somewhat smaller and are not barred. They are light underneath and have feathers on their legs and feet. They do not live on the open prairie but in the brush of the river valleys and rougher places. Like the prairie chickens they feed upon the small grains, especially corn and wheat, varying their diet with berries and the fresh green weeds and grass of the summer-fallowed fields.

(Photo by Russell Reid)
A prairie chicken nest.

Neither the prairie chickens nor the grouse are as plentiful as they were a decade ago and it is probable that the open season will have to be restricted or suspended for a time to enable them to replenish their numbers.

Pheasants

In recent years many parts of the state have been stocked with Chinese pheasants. In some of the southern counties, lying next to well-stocked regions of South Dakota, they are very plentiful and have become quite a nuisance to the farmer. At present there is no open season for pheasant shooting, but they are multiplying so rapidly that it is probable that a short season will be opened before long in some of the southern counties.

The pheasant is quite as large as most domestic chickens. The male is brilliantly colored and has a long "spike" tail. The pheasant is secretive in its habits and hard to kill, but it makes a delicious reward for the hunter.

Sage Hens

In the western part of the state, especially in the Bad-

(Photo by Russell Reid)

A baby eagle.

lands, where wild sage grows abundantly, sage hens are plentiful. They are smaller than the grouse and are of a yellowish brown color. They are often hunted for sport, but the strong sage taste renders their flesh unfit to eat.

Mud Hens

Mud hens are numerous in all parts of the state. They inhabit the sloughs and mingle readily with the ducks. They are often mistaken for ducks by amateur hunters, but their dark color, white bills, green legs and peculiar flight readily distinguish them. They are considered a game bird in most states and are easy to hunt, but their flesh has a strong taste which is disagreeable to most people.

Fish

Fish do not constitute a very important factor in the sport life of North Dakota. Practically all the rivers and many of the fresh water lakes in the eastern part of the state contain several of the more common varieties of fish. Perch, bullheads, suckers and pickerel are the most common. The most desirable game fish, wall-eyed pike, black bass, northern pike, rock bass and crappie are scarce. All of these fish will do well in the lakes and streams of this state, and to stock our streams is all that is necessary to have them in abundance.

Fish Hatcheries

There are three fish hatcheries in the state, located at St. John, Spiritwood Lake and Lisbon, and they are doing what they can to stock the streams with desirable fish. Almost any community which has fresh water may obtain fish from these hatcheries without charge, except for transportation. Many Izak Walton Leagues have been organized in the state and are doing much to stock favorable places with fish and birds. They carry on a continuous campaign for the proper protection of game and fish, and for the destruction of crows, cats and other pests which destroy game and song birds.

Song Birds

Aside from the game birds there are several hundred varieties of birds in North Dakota. While it is difficult to make a general statement, we may say that most of them are well distributed over the state. Many varieties live on the open prairie, but more prefer the wooded river valleys and hilly regions. About 100 varieties can be identified in any community where there is some timber.

Among the most common birds of general distribution are many kinds of sparrows, the prairie horned lark, the meadow lark, the lark bunting, the wren, the yellow warbler, the gold finch, the barn swallow, the bank swallow, the king bird, the cow bird, the cat bird, the brown thrasher, the robin and several varieties of hawks and owls. These may be found in almost any grove or tree claim in any part of the state.

In the more thickly wooded areas we find white breasted nuthatches, flickers, chickadees, brown creepers, downy and hairy woodpeckers, and sometimes the red-headed woodpecker.

Some of our birds are called permanent residents because they nest here and remain here the entire year. These include the prairie horned lark, the English sparrow, the nuthatch, the chickadee, the blue-jay, the brown creeper, the crow, the downy woodpecker and the hairy woodpecker. Most other birds spend the winter in the south and return in the spring.

The southward migration begins in August with the flight of the gulls, orioles, warblers and swallows and continues usually into November when even the juncos and the tree sparrows leave for the states farther south. The return flight begins about the middle of March with the coming of flocks of horned larks, and longspurs. They are followed by robins, flickers and many kinds of sparrows. About the middle of May the flight is at its height. For about two weeks thereafter the wooded valleys are filled with countless birds on their way northward to their nesting places; then the restless movement ceases and the nesting season begins.

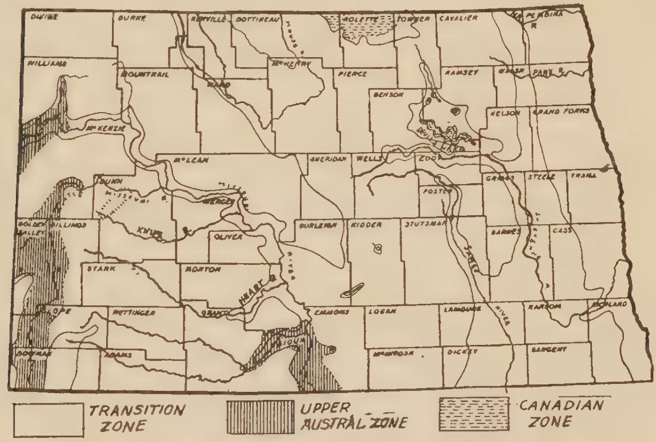
During the winter a few varieties of birds come south from Canada and spend a few weeks in this state. These include the snow bunting, the snowy owl and the redpoll. They enjoy our sunny, cold winters and find sufficient food for their needs.

CHAPTER XI

OUR FORESTS, FRUITS AND FLOWERS

The Life Zones

There are in North Dakota three distinct areas, called "life zones", each with its characteristic plants and animals. These are the Canadian or cold zone, the Upper Austral or warm zone, and the Transition zone, which lies between the other two. The Transition zone covers nearly the whole state, the other two zones dipping in only slightly from the north, south and southwest. Notice these areas on the accompanying map.



This map shows the three life zones of North Dakota.

These zones are not sharp-cut, but blend into each other in many ways. The animals and plants characteristic of one may be found in some places in another, but on the whole each zone has its distinct plant and animal life which is clearly marked from that of the other zones. The Canadian zone contains plants common in Canada and in the far north. The Upper Austral zone has plants found in the states farther south. In the Transition zone, as the name implies, the plants and animals are a blending and mixture of those found in the other two.

The Location of Forests

Since North Dakota is a prairie state the forested areas are comparatively few and small, being limited to the mountainous regions and river valleys. There are three reasons why trees do not grow extensively on the open plains: first, lack of sufficient moisture; second, severe windstorms which occasionally sweep the open country with resistless force; third, the frequency of forest fires at the time when the plains were covered with thick prairie grass. For these reasons forests have been able to survive only in the river valleys and rough uplands, where the rain water gathers in low, undrained places, where snow gathers in deep drifts and lingers long in the spring, and where the trees are protected from wind and fire by the surrounding hills.

The timbered areas are the Pembina Mountains, the Turtle Mountains, the Killdeer Mountains, parts of the Badlands, the hills about Devils Lake, and the valleys of the Red, Sheyenne, James, Missouri and Mouse rivers. Aside from these areas the growth of trees is limited to small patches in sheltered spots, and to tree claims and windbreaks which have been set out by the settlers.

Three Types of Forests

There are three distinct kinds of forests in the state. They are known as the Minnesota type, the Missouri River type and the Rocky Mountain type.

The Minnesota type is found along the Red River, in the Pembina and Turtle mountains, and around Devils Lake and Stump Lake. This growth consists mainly of elm, ash,

A forest in the Killdeer Mountains. (Photo by Russell Reid) boxelder, oak, basswood, poplar and ironwood trees and bushes of alder, service berry, chokecherry and rose. Poplar dominates in the Turtle Mountains and boxelder, oak, and ash in the Red River Valley.

The Missouri River type is found in the valleys of the Missouri and the Little Missouri. It consists of elm, ash, boxelder, cottonwood and willow, with bushes of buffaloberry, dogwood and currant. Cottonwood and willow predominate.

The Rocky Mountain type is found only in the Badlands. It is not extensive even there, but is represented by the yellow pine, juniper and western birch.

(Courtesy of N. P. Ry.)

A scene in the Pembina Mountains.

While these three groups are somewhat mixed, still they show a variety of soil and climate and help to determine the animal life of the region. In places other than the areas mentioned, the planted groves are more extensive and more valuable than the natural growth of trees.

Our National Forest

There is a national forest in the southwestern part of the state, set aside for the protection and propagation of the trees in that region. It is rough Badland country sparcely covered with yellow pine. However, the soil,

A view in the national forest. (Photo by Russell Reid) climate and surface contour of that region are well suited to the growth of that valuable timber. The lack of other vegetation and the thin growth form a natural protection against fire, the most deadly enemy of any forest.

The forest occupies about one township in the northern part of Slope County. With the expenditure of some money in setting out more trees this reserve should produce an annual crop of excellent pine lumber in a country where a high grade of lumber is badly needed.

Forestry Schools and Nurseries

In order to aid in the development of forests a school of forestry was established at Bottineau in 1907. Since then it has been changed into a teacher training school. At Mandan there is located the Northern Great Plains Field Station which has given great help to the science of forestry and agriculture in this state. This institution has developed especially the trees, grasses and plants suited to a semi-arid country such as exists west of the Missouri River.

(Courtesy of N. P. Ry.)

Trees grown by cultivation.

There are several nurseries in the state which have made valuable contributions to forestry. The largest of these are the Northwest Nursery at Valley City and the Will Nursery at Bismarck.

There are many regions of North Dakota which can be and should be forested, where the expense would be slight. The bottom lands of the Missouri, Mouse, James, Sheyenne and Red rivers offer plenty of moisture and shelter for any variety of trees. Almost any part of the Badlands will grow yellow pine on land that cannot be cultivated. Throughout the whole state there are thousands of small areas about lakes and sloughs which are too stony for cultivation but which will support a profitable forest crop. Much more study and experiment should be given to the possibilities of this industry.

Fruit Orchards

Fruit growing as an industry has not developed to any great extent, though there are some good apple orchards in the southern part of the state. Wild plums, crab apples, goose berries, wild cherries, black haw and blue berries grow luxuriantly in their wild state. Strawberries and raspberries grow readily in field and garden.

Native Foods

While most of the foods and flowers we now have were brought here from Europe, some are native to America and were not known to white people before the discovery of this continent. This is true of corn, beans, squashes, potatoes, sunflowers and tobacco. These were contributed to the storehouse of man by the Indians. The agricultural tribes that lived along the Missouri River raised large fields of corn and beans in this state more than two hundred years ago. Corn, beans and squashes were of tropical origin and were first used by the natives of South America and Mexico. Potatoes, sunflowers and tobacco developed in North America.

(Courtesy of N. P. Ry.)

Apple and plum trees thrive in North Dakota in those areas which have a long frost-free season.

The Indians used many things for food which we do not so use. They ate acorns, removing the tannin by cooking them in lye. They also ate the fungi that grows on dead trees, corn smut (while white and solid), milkweeds and artichokes. They made sugar from the sap of the box elder tree and tea from the leaves of the raspberry and the mint.

Many native fruits were found upon these plains and were used by the Indians. Among these were the raspberry, plum, chokecherry, thornapple, gooseberry, red and black currants, June berry, black haw, pembina, strawberry, buffalo berry and wild grape.

The hazel-nut is the only nut native to this state.

Flowers

North Dakota is rich in the abundance and beauty of its flowers. There are many varieties, some abounding in all

(Photo by Russell Reid)

The pasque flower or crocus—the first flower to greet us in the spring.

parts of the state, some flourishing only in limited areas well suited to their growth. Among those scattered over the whole state are the wild rose, our state flower, the pasque flower, the violet, the wild flax, the spiderwort, the anemone, the bluebell, the aster, the black-eyed Susan, the golden glow, the flame lily and the purple corn-flower.

The most common vines of state-wide distribution are the Virginia creeper, the bittersweet, the grape, the hop and the clematis.

In the wooded regions, such as the Pembina Mountains, the Turtle Mountains, the Killdeer Mountains and the hills about Devils Lake, we find a variety of beautiful forest flowers; the wild columbine, the star-of-Bethlehem, the lady's slipper, the yellow star flower, the shooting star and the gentian. The white larkspur is found on the prairie in the eastern part of the state. The white anemone is found in low, damp places throughout the state. The pink oxalis may be found in sandy places. The golden rod is of general distribution.

The Vegetation of the Missouri Plateau

As a traveler enters the western part of this state from the eastern part it becomes apparent to him that the vegetation of that region is very different. In place of a bright green, as in the east, the fields are a dull gray. This difference in color is due to the effect of the semi-arid atmosphere upon the vegetation. The plants have adjusted themselves so as to conserve what moisture they get. The plant covering is thicker and is hairy, making the plant appear a gray-green.. This is especially noticed in the sage brush, the prairie clover, the false red mallow and the grass.

There is also a noticeable change in the kind of vegetation and in its location. Plant life is abundant only along the streams, the banks of which are lined with cottonwood, boxelders and willows. On the hillsides are creeping juniper and scattered patches of bull pine and scrub oak which show the effects of severe winds. In the Badlands juniper, bull pine and red cedar are common on the hills. Sage brush is well scattered over the valleys, giving them a purple-gray appearance. The grass of the whole western plateau is thin and short. The region is spoken of as "the short grass country."

Our Worst Weeds Came from Europe

Through human carelessness most of our worst weeds have been brought to this continent in seed grain shipped from some of the European countries. Among these weeds of foreign origin are the dandelion, the Russian thistle, pigeon grass, catnip, quack grass, pigweed, chickweed, mustard, burdock, mullein, and sow-thistle.

The Distribution of North Dakota Vegetation

According to Dr. Melvin R. Gilmore, formerly superintendent of the state historical society, and a well-known authority on the plants of this region, the various forms of vegetation are distributed in North Dakota as follows:

Of State-wide Distribution

Trees: Willow, cottonwood, boxelder, ash, elm, bur oak.

Shrubs: Red raspberry, wild rose, June-berry, thorn-apple, plum, chokecherry, black currant, gooseberry, kinnickinnick, sheep-berry, wolf berry, honeysuckle.

Vines: Clematis, moonseed, bittersweet, hop, wild grape, Virginia creeper.

Flowering Plants: Anemone, pasque flower, violet, monarda, strawberry, buffalo pea, ground bean, prairie clover, gaura, bluebell, blazing star, baltonia, aster, black-eyed Susan, golden glow, purple cone-flower, goldenrod, sunflower, prairie thistle, spiderwort, flame lily.

Grasses: Big blue-stem, little blue-stem, sweet grass, grama grass.

Only or Mainly in Red River Valley, Pembina and Turtle Mountains and in Region of Devils Lake

Trees: Linden, poplar, trembling aspen, ironwood, paper birch.

Shrubs: Bear berry, eye berry, wood wild rose, pin cherry, wild red currant, silver berry, smooth sumac, hazelnut, speckled alder, pembina berry.

Flowering Plants: Columbine, shooting star, gentian, yellow star-flower, lady's slipper.

On Missouri Plateau

Flowering Plants: False red mallow, bee balm, wild blue flax, penstemon, merteusia, puccoon, lupines, ball cactus, prickly pear, wild sage, yucca.

Only or Mainly in Badlands

Trees: Bull pine, red cedar.

Shrubs: Buffalo berry, aromatic sumac.

Flowering Plants: Yucca or soap weed, ball cactus, prickly pear.

Make a list of all of these trees, shrubs and plants that are found in your neighborhood.

CHAPTER XII

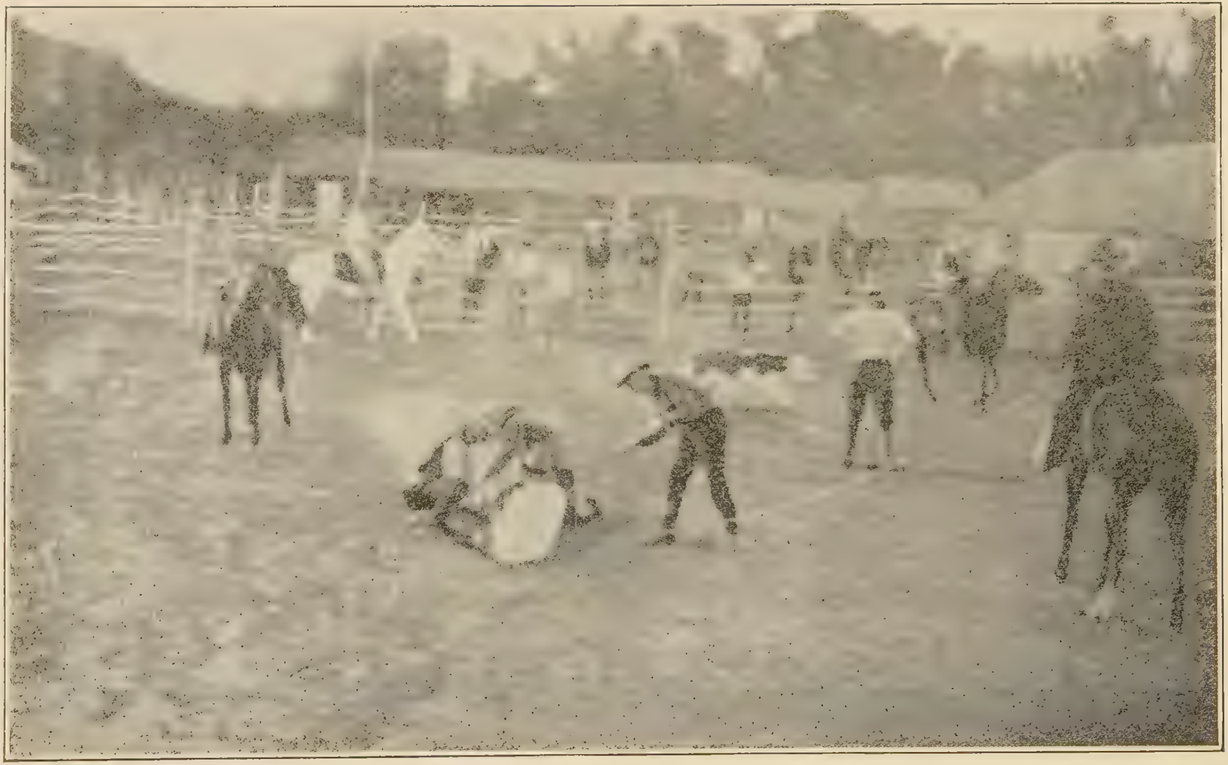
THE EVOLUTION OF FARMING—OUR GREATEST INDUSTRY

The Four Great Changes

For sixty years agriculture has been the chief industry of North Dakota and it probably will always hold first place. During this time four great changes have taken place in agriculture, all for the better. First, stock raising on a large scale on unfenced ranges has given place to the cultivation of the soil and the raising of small herds of blooded stock. Second, the large bonanza farms consisting of many sections have disappeared for the most part and small, well tilled farms have taken their place. Third, while formerly most farmers rented their land, now the large majority own their own farms. Fourth, the one crop plan of growing only wheat has given way to diversified farming. Let us examine each of these changes more in detail.

Ranching Has Given Place to Farming

Stock raising on open ranges was a large and profitable industry fifty years ago. It had its important place in our development, but, while it existed, the state could never become a well settled commonwealth. That one industry could not support a large population, and by its very nature prevented settlement. It kept the state from developing in other ways. The great possibilities of the soil, of the mines, and of manufacture could not be developed. The building of cities with their factories, commerce and trade was impossible. Our excellent schools and churches, good



A branding scene on the Peaceful Valley Ranch. (Courtesy of J. M. Devine.)

roads and modern homes would be out of the question. It is the tilling of the soil that gave us these things.

The Farms Have Become Smaller

The first farms of importance were established along the Northern Pacific Railroad and in the Red River Valley in the vicinity of Fargo in 1873. They were owned by wealthy railroad stockholders who were given the land in place of their stock when the railroad company failed in that year. Many of these men were left with large estates of many thousands of acres. Lewis Cass, after whom Cass County was named, received an immense tract of land in Cass County.

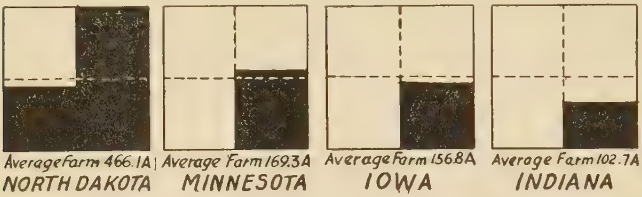
These vast farms were placed in charge of managers. Fortunately they were successful, due to the extreme richness of the soil and to several favorable seasons. They attracted thousands of settlers to the state. Land was cheap and most people took all they could get. Land was purchased not so much for farming as for investment, to sell at a higher price. Thus the first farms were very large, much larger than the farmers could hope to cultivate with their limited means and equipment.

This "big farm" movement took place in every part of the state as each part was first settled. It took place in all of the new western states. Its spirit is reflected in those lines of W. J. Foley's "A Letter Home":

> "Why your farm and all the others
>   That we used to think so fine
> Wouldn't, lump 'em all together,
>   Make a corner lot of mine."

Our people have learned in recent years by hard experience that it is not wise to try to farm too much land. It is more profitable to have a small farm, equip it well and work it thoroughly.

As a result of this experience farms have been growing smaller and smaller, to the benefit of both the farmer and the state. However, the average North Dakota farm is still much too large, being over 450 acres, nearly three-quarters of a section. This is three times as large as the average farm of Iowa and four times as large as that of Indiana. Its further reduction is bound to come and the sooner the better for all concerned.



(Courtesy of N. P. Ry.)

This graph shows the average size of farm in four agricultural states.

The smaller farm means better farming, better improvements, diversified farming, rotation of crops, the building up of the soil, more corn and hogs, more beef, cream, poultry and eggs, and hence a continuous income for the farmer. It means more prosperity for all of us.

More Farmers Own Their Own Farms

The coming of the smaller farm has made it possible for more farmers to own their own homes and land. The renter has been able to buy the farm he tilled on contract or on the "crop payment" plan. This movement has gone on until two-thirds of the farmers of the state now own their own farms. There are approximately 76,000 farms in the state, of which 50,000 are operated by the owner.*

The great benefit of this change can be seen when we note the advantages of land ownership over renting. The man who owns his own farm wants to improve it with better buildings and fences. He wants to build up a small herd of good cattle, some sheep and some hogs. He wants good roads to his farm, a good school for his children and good neighbors to associate with.

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*Note. Of the 34 million acres now under cultivation over 23 million are tilled by the owner.

On the other hand the average renter is not interested in building up land that belongs to someone else. He is not interested in repairing buildings, and the machinery often stands out all winter for want of a shed. He is too prone to take all he can get from the farm, with as little work as possible, and when it ceases to pay, move to some other place.

Even the owner does not want to spend money improving a farm which he rents out. He wants to get his rent with as little outlay as possible. He does not, as a rule, want the farm taxed for better roads, which he would not use himself, nor for a better school for the renter's children.

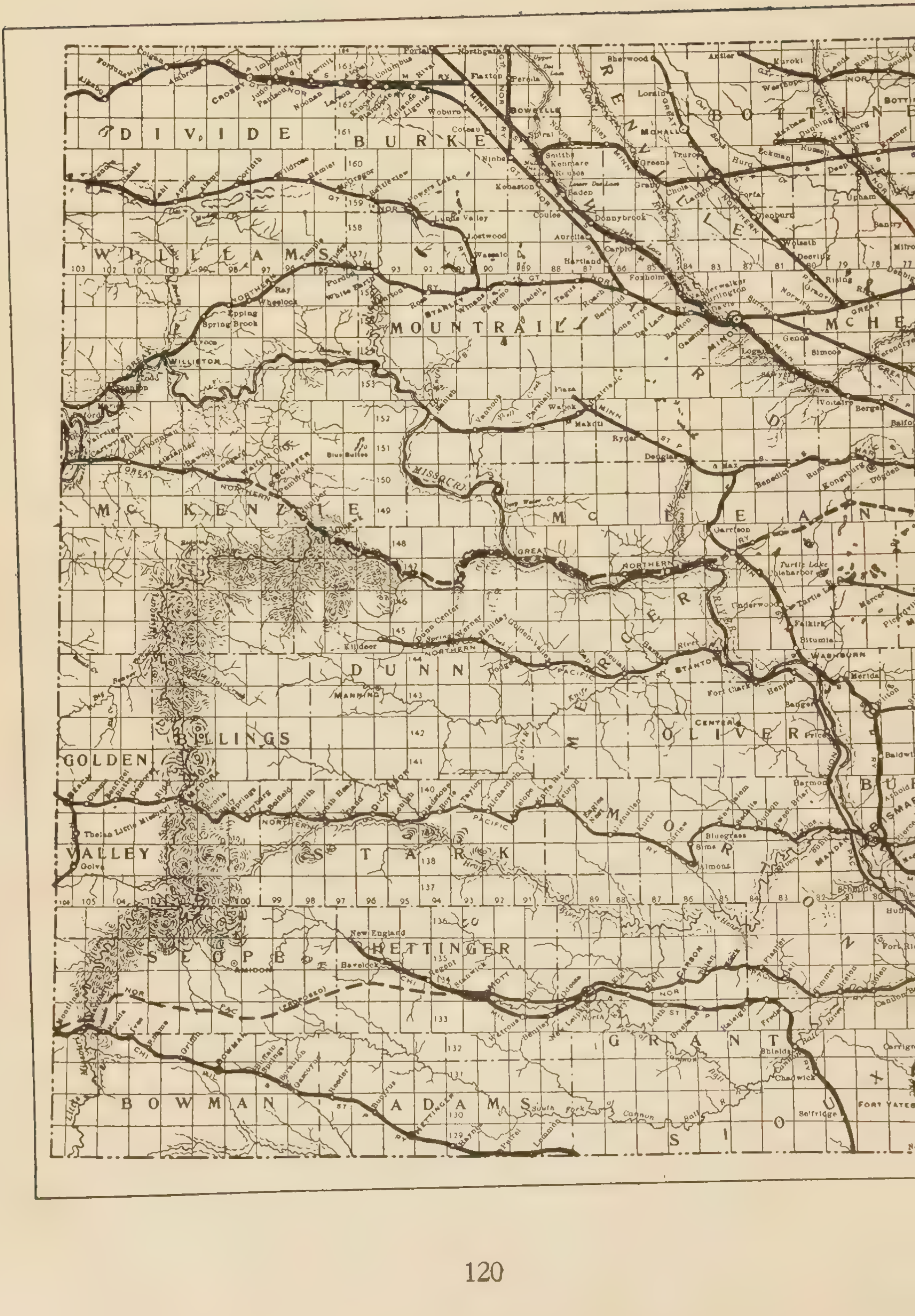
Thus the rental system drags down both the farm and the community through human selfishness. Both the farm and the community are improved as more and more farmers own their own land.

(Courtesy of N. P. Ry.)

Scenes of burning straw piles are becoming less frequent from year to year.

There is More Diversified Farming

With the coming of smaller farms and more farm ownership has come a strong tendency toward diversification,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BILLINGS
GOLDEN
VALLEY
STARK
MORTON
SLOPE
HETTINGER
GRANT
BOWMAN
ADAMS
SIOUX
Crosby
Columbus
Portal
Flaxton
Bowbells
Kenmare
Mohall
Sherwood
Antler
Williston
Epping
Spring Brook
Ray
Wheelock
Tioga
White Earth
Stanley
Minot
Garrison
Underwood
Washburn
Stanton
Fort Clark
Center
Beulah
Hazen
Killdeer
Dunn Center
Manning
Medora
Belfield
Dickinson
Glen Ullin
New Salem
Mandan
Bismarck
New England
Regent
Mott
Amidon
Bowman
Hettinger
Carson
Flasher
Almont
Golva
Selfridge
Fort Yates
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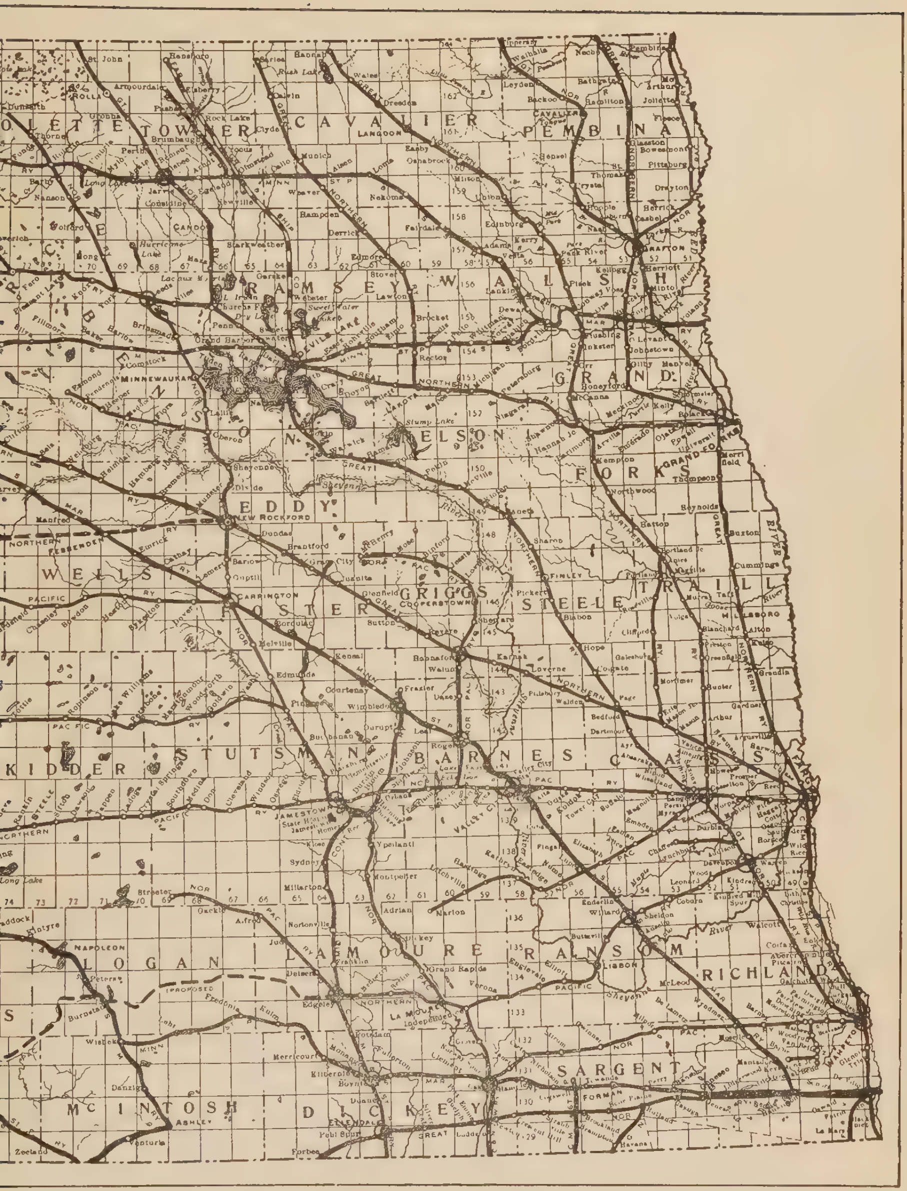
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KIDDER
STUTSMAN
BARNES
CASS
LOGAN
LA MOURE
RANSOM
RICHLAND
McINTOSH
DICKEY
SARGENT
Rolla
Langdon
Cavalier
Grafton
Devils Lake
Minnewaukan
New Rockford
Carrington
Cooperstown
Jamestown
Valley City
Fargo
Lisbon
Napoleon
Ashley
Ellendale
Forman
Wahpeton
Hillsboro
Larimore
Park River
Lakota
Fessenden
Drayton
St. John
Walhalla
Pembina
Bathgate
Hamilton
Cando
Minto
Lakota
Northwood
Mayville
Portland
Casselton
Buffalo
Tower City
Oakes
Edgeley
La Moure
Milnor
Enderlin
Sheldon
Kindred
Hankinson
Northern
Great Northern
Nor Pac
Minn St P
Soo
Sheyenne River
Red River
Stump Lake
Devils Lake
(Proposed)

the growing of several crops instead of just wheat, as in former years. The large farms of early days, consisting of several sections of land loaned themselves to wheat farming. One crop was all that the manager had to look after and provide equipment for. Diversification was impossible on such a large scale. A generation of wheat growing depleted the soil for that purpose. Then the smaller farm came and made it possible to grow several crops and to build up the soil by rotating them. Thus the smaller farm with diversification of crops has given North Dakota a new outlook and is bound to make this state one of the wealthiest agricultural states of the country. We know this because other western states, now wealthy, such as Iowa, Kansas and Illinois, have had exactly the same experience.

In place of the one crop of wheat formerly raised North Dakota now produces excellent crops of corn, alfalfa, flax, oats, barley, rye, hemp, timothy, beans, peas, potatoes, sugar beets and many other things in lesser quantities, besides the finest breeds of cattle, sheep, horses, hogs and poultry. Year after year wheat growing keeps giving way to diversified agriculture and the extent and value of these varied crops keeps increasing. Since these various crops are building the prosperity of our state, we should take time here to study them more in detail.

CHAPTER XIII

OUR PRINCIPAL CROPS

Wheat

North Dakota leads all states of the Union in the production of number one hard wheat. Its yield averages about one hundred million bushels per year, one-seventh of all produced in the United States. About one-half of the cultivated land now grows wheat. It is probable that the state will lead the nation in this respect for many years to come.

(Courtesy of N. P. Ry.)

Threshing wheat—a familiar scene.

Well managed farms produce twenty bushels or more per acre and the college of agriculture tells us that the yield can be increased five bushels per acre by using the best varieties of adapted seed. Also, it can be increased another five bushels by a systematic rotation with alfalfa, clover, potatoes, corn and sugar beets. In this way it would seem possible to produce all the wheat we are now producing on two-thirds of the land now used, leaving the rest for other crops.

Although our wheat acreage is being cut down it is probable that the total yield will increase, due to the rotation of crops, better seed and more intelligent farming.

A typical North Dakota wheat field.

Corn

Corn was grown in this state along the Missouri River by the Mandan Indians and other agricultural tribes two hundred years ago. We now grow a million and a half acres annually and the amount is increasing every year. In large fields the yield is from 25 to 75 bushels per acre.

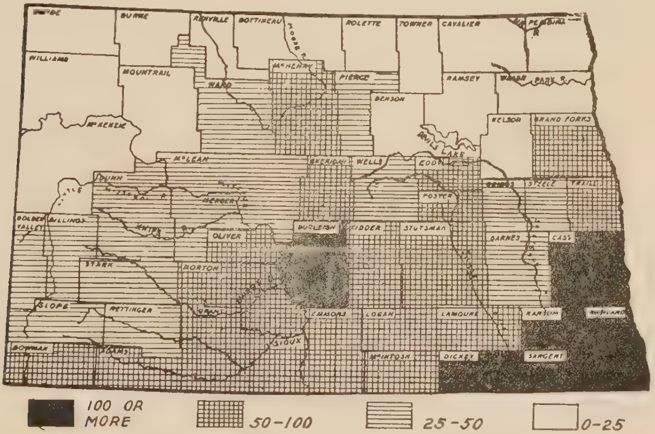
(Courtesy of N. P. Ry.)

Corn is a good crop in North Dakota.

In small fields, where it is cultivated more carefully, the yield is much greater.

A study of the accompanying map shows that corn is being raised extensively in two-thirds of the state. Twenty-two of the fifty-three counties raise at least half as much corn as wheat. Six of them raise more corn than wheat, and three, Ransom, Dickey and Sargent, raise twice as much.

The corn raised under the best conditions compares favorably, both in fodder and grain, with that raised in the famous corn states of Illinois and Iowa. Seed which has been grown in the state for some time gives the best return.



(Courtesy of N. P. Ry.)

This graph shows the bushels of corn grown for every 100 bushels of wheat in the various counties in 1928.

Corn is very important both as a rotation crop and for feed, and will become more so as the number of cattle and hogs increases. Several varieties of flint corn, which grows short, are fed standing, or are "hogged out", and have proved very profitable when fed in that way. The number of silos is increasing rapidly. A well known authority on corn has said that North Dakota belongs in the corn belt.

Flax

North Dakota produces more than half of the flax grown in the Untied States. The average annual crop is over a million acres, yielding from 6 to 22 bushels per acre. It has been customary to sow flax on newly broken soil and extremely profitable cash crops have been produced in this way. The more recent use of wilt-resistant varieties makes it useful as a rotation crop.

Flax is raised both for the seed and for the straw. The seed is used mostly for flaxseed oil. The straw is baled and shipped to tow mills where it is prepared for the manufacture of linen.

The beautiful, deep blue of a flax field in blossom, waving in the breeze like the billowing of a great, blue sea is a sight familiar to every North Dakota boy and girl.

Hemp

Hemp can be grown in this state, and has been grown profitably in a small way. All that is needed is a tow mill within easy hauling distance. Hemp is drilled into the ground as wheat is and grows to a height of from six to twelve feet. The leaves are so large and thick that they completely shade the ground, killing the weeds and leaving a clean soil for the next year's crop.

The hemp stalks, as large and heavy as corn stalks, have to lie on the ground all winter to rot, or "ret", as hemp growers say. It is then gathered up in bundles and hauled to the tow mill. The fibre, which is much more valuable than flax straw, is used in making rope, twine and ocum, which is used in calking boats.

Other Small Grains

Barley, oats and rye are grown extensively and their acreage steadily increases. The average acreage of barley is about a million and a half acres, that of oats about three million. The rye acreage is small. Oats are raised mainly as feed for dairy cattle and sheep. Barley is used to fatten cattle and hogs for market. Rye goes to make rye bread.

North Dakota leads the nation in the production of rye and is among the first in the growing of barley.

Beans and Peas

Both peas and soy-beans are grown extensively in all parts of the state. The peas are often seeded with oats and cut green for feed. Soy-beans are usually grown next to corn that is to be "hogged off", where the hogs are sure to find it. Both are raised mainly for hog feed.

Alfalfa

Next to corn, alfalfa is the most important feed crop. It is also an excellent soil builder. The high lime content of the soil makes North Dakota an ideal place for this crop and its success here, with that of corn, is bound to make this one of the leading stock raising states.

Alfalfa is grown in all parts of the state successfully but most extensively in the eastern portion. Its acreage has increased from 9,000 to 36,000 acres, four-fold, in the last ten years. It is is well established as an excellent food for cattle, hogs, sheep and turkeys. It is especially fine for fattening stock for market and for increasing milk production.

The yield varies from one and one-half to five tons per acre depending upon the season and whether two or three cuttings are made. It has often earned from $100 to $200 per acre for seed. The Pure Grimm variety has proved itself to be the most dependable and productive because it is hardy and better adapted to our northern climate.

A good stand of alfalfa. (Courtesy of N. P. Ry.)

In clover. (Courtesy of N. P. Ry.)

Like alfalfa, sweet clover does two important things for the farmer: it feeds his stock and rebuilds his soil.

Only a decade ago sweet clover grew only along the roadsides and was despised as a nuisance. Farmers then cut it to prevent its spreading over the farm. But, like Cinderella, it has suddenly risen to a position of importance and respect.

In 1919 there was hardly enough sweet clover in the state to notice, about 20,000 acres. Five years later there were more than 300,000 acres. Today there are about 500,000 acres.

(Courtesy of N. P. Ry.)
Putting up sweet clover in Grand Forks County.

As a forage crop sweet clover is unequaled. A good stand will pasture three cattle or ten sheep per acre, and it will pasture any kind of stock to great advantage. Grown for seed it has commonly earned $50 to $100 per acre.

Sweet clover does many things for the soil. Its roots leave in the soil a supply of nitrogen which all crops need. Plowed under, it furnishes humus and helps to hold the moisture. Also the long roots bore their way several feet into the ground forming passageways for water and air.

Putting up hay with a tractor. (Courtesy of Soo Line)

Prairie Hay

While timothy, red top, millet and broom grass are grown extensively and profitably for feed, the native prairie hay which for centuries furnished feed for millions of buffalo, elk and antelope still makes up two-thirds of the state's hay crop. This prairie grass is thick and nutritious and has the quality of retaining its nutrition when curing naturally on the stalk.

There is hardly a farm without its natural meadow or "hay slough" and in years of open winters cattle may be seen grazing there nearly all the year. All that can be harvested readily is usually put up like the seeded varieties for winter feed.

Potatoes

Potatoes are raised in all parts of the state but more extensively in the Red River Valley. In 1923 there were something over 150,000 acres. The crop averages from five million to eight million bushels. The yield on unprepared ground is about 100 bushels per acre, but following alfalfa or clover it often reaches 200 and occasionally 250 bushels. The market price is not at all dependable but often reaches a dollar per bushel. The most profitable part of potato raising is growing seed for southern and western states. North Dakota seed potatoes are considered the very best.

Potatoes make an excellent rotation crop because their cultivation cleans up the soil and prepares the way for a big yield of other crops the next year.

Sugar Beets

Sugar beets are grown quite extensively, several thousand acres annually, in the Red River Valley. The industry has not spread over the rest of the state because of the

(Courtesy of N. P. Ry.)

These vegetables were grown on one North Dakota farm.

Picking berries in North Dakota. (Courtesy of N. P. Ry.)

long shipping distance to sugar factories in Minnesota. A large factory at East Grand Forks makes the industry profitable in the valley counties. The yield is usually from eight to fifteen tons per acre.

(Courtesy of G. N. Ry.)
Harvesting sugar beets in the Red River Valley.

Beets are a good crop to clean up the land, and therefore make a good rotation crop. The tops make good feed.

A modern farm home, built by intelligent diversified farming.

CHAPTER XIV

DAIRYING—OUR GREAT INDUSTRY OF THE FUTURE

Dairying

No industry in North Dakota has developed more rapidly than that of dairying and no industry is now upon a sounder basis. Its many advantages give promise of making North Dakota one of the leading dairy states within the present generation.

Dairying has many advantages. It is profitable; the price is always good; the income is certain and is spread over the whole year; the industry is not easily damaged by weather conditions such as frost, flood and wind; and it builds up the soil.

North Dakota is ideally fitted by nature to become a great dairy state. The almost unlimited amount of native grass, the ease with which feed crops can be grown and the long open grazing season, all contribute to its success.

The increase of dairy cattle and dairy products in the past ten years is astonishing. According to the report of the dairy commissioner, the number of dairy cows increased from 221,000 in 1916 to over 300,000 in 1926. There are now over 400,000 dairy cattle in the state. The butterfat increased from about six million pounds to over thirty million pounds in the same ten years. These figures not only show an increase in the number of cows and their total product but a decided increase of butterfat for each cow, showing that much better cows are being secured. In 1923 the total value of dairy products in the state was two-thirds of the value of the wheat crop.

The interior of a modern dairy. (Courtesy of Soo Line)

To furnish a ready market for the dairy output a number of large creameries have been located at convenient points, Grand Forks, Grafton, Devils Lake, Minot, Northwood, Bottineau, Rugby, Stanley, and Williston, through the northern part of the state, and at Fargo, New Rockford, Hillsboro, Ellendale, Lidgerwood, Oakes, and Finley, in the southeastern part. Besides these large plants there are local co-operative creameries in most county seats. With this well distributed market, no farmer has to ship his product very far.

Great care is now being taken to select the very best dairy cows. The "scrubs" are being killed off and only the best strains are bred. Our best herds are now competing with the famous dairy herds of Minnesota and Wisconsin. There has hardly been a year recently when North Dakota breeding cattle have not taken first or high prizes at state fairs and international stock shows. At the present rate of improvement North Dakota will soon be in the front rank.

(Courtesy of Soo Line)
One of our many co-operative creameries.

Dairying is of great economic importance to the state

1. Some Cass County Herefords. (Courtesy of G. N. Ry.)

2. North Dakota mortgage lifters. (Courtesy of G. N. Ry.

because any farmer, anywhere, can, by keeping a few good milking cows, be assured of a cash income the year around. A few good jerseys, guernseys or holsteins will pay his taxes and the interest on his whole investment.

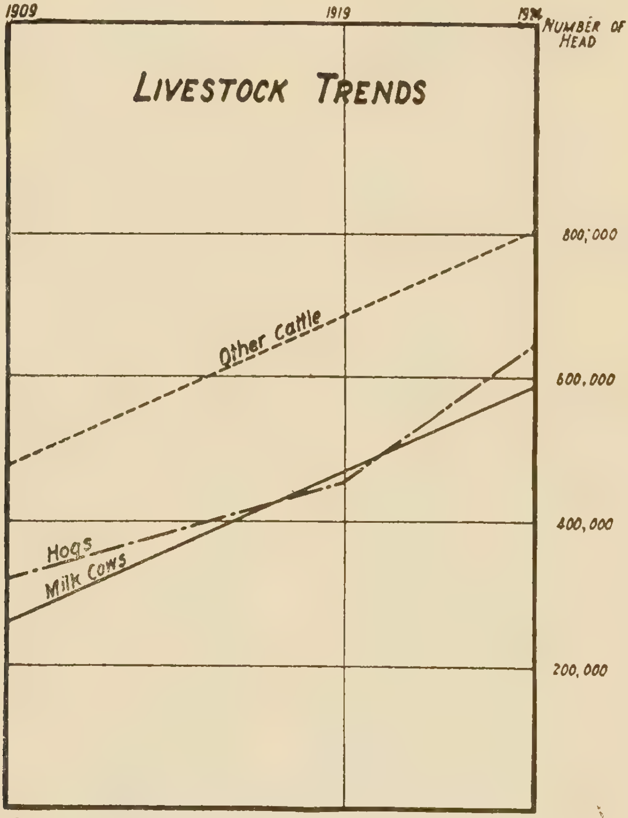
Beef Cattle

The ease with which excellent feed crops are grown makes North Dakota as well suited to the raising of beef cattle as to dairying. The finest herds of Aberdeen-Angus, Herefords, and Shorthorns are being developed with remarkable rapidity. In the past three years beef cattle shipped from points on the Great Northern Railroad have increased thirty-five per cent. The accompanying graph shows the increase in the leading varieties of stock from 1910 to 1925. The decline shown in the number of milk cows from 1920 to 1925 was due to the thinning out of "scrubs" and the substitution of good dairy stock. During those years the total production of butterfat more than doubled. North Dakota stock does not have to be sent to the stock yards to be "finished". It is easily fattened at home on home grown feed.

Sheep

Like other branches of livestock sheep raising is a comparatively new industry in North Dakota, but it is increasing the most rapidly of them all. Over a million and a half pounds of wool were shipped out of the state in 1923. Recent estimates indicate a continued increase since that time.

The dry, cold climate of North Dakota, with absense of long, hot, humid spells found in the states farther south and east, makes it an excellent place for sheep. The many diseases that beset them in warmer states do not get such a hold in this climate. Sheep feed on sweet clover in the summer, on stubble in the fall and screenings in the winter. They are excellent for the land, eating weeds, weed seeds and all sorts of roughage. An inexpensive, straw-covered shelter is all the home they ask. There are many rough regions where sheep will pick a good living from land that is otherwise useless.



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(Courtesy of N. P. Ry.)
This graph shows the rapid increase in the number of hogs and cattle in recent years.

Hogs

The increase in hog raising is even more marked than in cattle raising. As shown by the accompanying graph, there has been a phenomenal increase in the last few years. This has been due to the ease of growing corn, barley, and other feed crops and to excellent prices. Packing plants are offering top prices for North Dakota hogs. Due to barley feeding they are considered better for bacon than the fatter corn-fed hogs of Illinois and Iowa.

Poultry

A dry climate, plenty of sunshine, extensive range and feed make North Dakota a perfect place to raise domestic fowls. Nearly every farm has its slough or creek for ducks and geese. The broad stubble fields of corn, wheat and barley furnish unlimited range and feed. This branch of farming has more than doubled in the past five years. It now brings the state about fifteen million dollars annually. North Dakota is among the first as a poultry raising state.

At the All-American Turkey Show held in Grand Forks in 1926, the championship was awarded to a Nelson County, North Dakota, grower. The prize bird sold for a thousand dollars.

The opportunity for expanding poultry raising is unlimited. Conditions are extremely favorable and profits are large. Ten or fifteen hen turkeys will earn an income of three hundred dollars to five hundred dollars per year. As a side line they will earn almost any farmer two thousand dollars or more per year. There are many hatcheries furnishing high producing stock. Most creameries buy both poultry and eggs.

Bees

Bee culture is extensive in North Dakota. The number of colonies has increased from seven hundred to over twenty thousand in the past seven years. This state now leads the forty-nine in the average production per hive. In 1925 the average production in this state was one hundred seventy-four pounds per hive, while the average for the

Some North Dakota sheep. (Courtesy of Soo Line) whole United States was only fifty pounds. Many growers average from two hundred fifty to two hundred seventy-five pounds per hive. This large production is due to

A small North Dakota apiary.

the increased acreage of sweet clover. The industry is sure to grow rapidly in this state because it requires but little work and is so very productive and profitable.

Stock Marketing

There are two packing plants in the state, one at Grand Forks and one at Fargo, which help to solve the livestock marketing problem. They furnish a market two hundred fifty miles nearer than Duluth and St. Paul. With the excellent graveled highways a farmer in the eastern half of the state can take a truck load of livestock to one of these plants in a short time and at little cost.

The main lines and branches of the four great railway systems penetrate to every section of the state. With stock yards at all cities and large villages they furnish good service to the shipper.

While considerable livestock is shipped to Winnipeg and Duluth, the great bulk of shipments from North Dakota go to South St. Paul. Shipments can be made there from any part of North Dakota in from twenty-four to forty-eight hours.

South St. Paul has in recent years become one of the leading livestock markets of the United States. It holds first place in the nation as a market for dairy cows, second for veal, third for pork, and fourth for beef. Every year the value of livestock bought at South St. Paul is about one hundred million dollars.

Freight rates from North Dakota points to the various markets are very reasonable when we consider the long distances and the light traffic as compared with states farther east. In giving a decision in a recent freight rate case the Interstate Commerce Commission, which has power to fix rates on all goods shipped from one state to another, said "The fact remains that rates from North Dakota are conspicuously low as compared with rates from other localities where conditions in general appear more favorable."

Grain Marketing

A small part of the grain raised in this state is shipped to Europe but most of it is manufactured into flour or meal in nearby markets and consumed in the United States. Grain for foreign markets is usually shipped to Duluth and by the Great Lakes to Buffalo, New York, thence by the Erie Canal to New York City, and by ship to Liverpool, England. Liverpool is the center of the world's grain market and it is there that the market price of wheat is determined. The price of wheat in North Dakota or anywhere in the United States is the same as the price in Liverpool, less the freight rate from there to Liverpool.

The St. Lawrence Waterway

There is a plan being considered to deepen the St. Lawrence River in places and to dig a ship canal around the Le Chine Rapids just above Montreal. Such a canal would permit ocean-going ships to come inland as far as Duluth and save the great expense of unloading and loading grain at Buffalo and again at New York City.* The St. Lawrence route is both shorter and cheaper than the Erie Canal route.

The St. Lawrence route would reduce the freight on wheat from North Dakota to Duluth about five cents per bushel, thus giving our farmers five cents more per bushel for their wheat. In this way the new project would save North Dakota farmers about five million dollars per year.

Minneapolis and Duluth Markets

Minneapolis and Duluth are our principal grain markets. Minneapolis receives over 200,000,000 bushels of grain every year. Its sixty-six elevators store over fifty million bushels and its twenty-seven mills make over twelve million barrels of flour every year. The Duluth-Superior market usually receives nearly as much grain as Minneapolis, but most of it is shipped on to eastern markets.

Duluth and Minneapolis are about equally distant from points in the southern half of North Dakota. Duluth is considerably nearer to shipping points in the northern half of the state.

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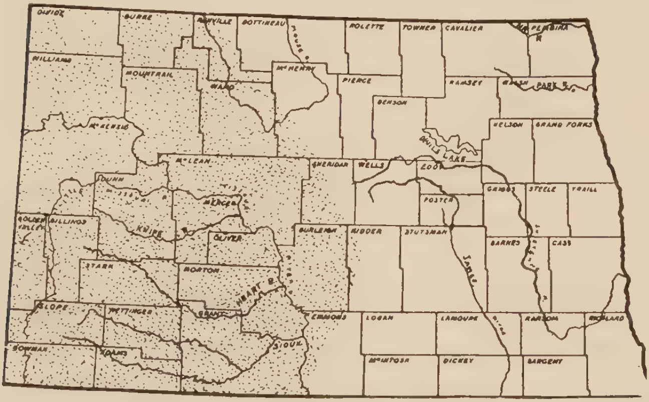
*Note. Ocean ships can pass from Lake Erie to Lake Ontario by means of the Leland Canal, which has recently been made a ship canal.

CHAPTER XV

COAL—OUR GREATEST NATURAL RESOURCE

Coal

The most important mineral product of North Dakota is lignite coal. This exists in almost unlimited quantity. The whole western half of the state is underlaid with it, where it lies in veins from four to thirty feet in thickness.



This map shows the coal field which underlies the western part of the state.

It is estimated that there are over five hundred billion tons of it. At the present rate of mining, about one million tons per year, it would last five hundred thousand years. The eastern half of the state has no coal deposits. Notice the coal area on the map.

The Origin of the Coal Fields

We have seen that the ocean once covered about half of the North American continent, including the Mississippi Valley and the great plains. All of what is now North Dakota was submerged at that time. We know that the sea covered the land for long ages because of the many layers of sandstone, limestone, shale and mud which it deposited.

At a later time the floor of the ocean was gradually elevated and the waters withdrew to their present position. This rising of the ocean's floor was not a steady process nor did it all rise at the same time. Certain areas would rise above the surface and remain for thousands of years, only to be submerged again for another long period. Some areas would rise above the surface and sink again several times. Some regions would be submerged while others were dry land. Thus the process by which the bottom of the inland ocean became dry land was intermittent and irregular.

While a certain area was above water it became covered with vegetation. Dense forests flourished for thousands of years. We know that the trees were of immense size for we have found stumps as much as fifteen feet in diameter in the coal beds of our state. In these forests the leaves, branches and trunks of trees accumulated to a depth of many feet. Then the land would be submerged again and the water would cover the forest with thick layers of mud and sand, some of which afterward hardened into shale and sandstone while some remained as loose sand and mud. As these submerged forests rotted, much of the oxygen and hydrogen in the wood passed off, leaving the black carbon in the form of vast beds of coal. The alternate rising and sinking of the surface has thus given us alternate layers of coal, clay and sandstone, just as we find them now.

Three Kinds of Coal

The coal found in this state is called lignite from the Latin word lignum, meaning wood. It has been formed more recently than other kinds of coal, and is therefore more like wood. Anthracite or hard coal is much older. It is found farther down in the earth and was formed under the very great pressure of many hundreds of feet of rock and earth. Bituminous or soft coal is younger than anthracite but is still very old. It contains much oil, which makes it smoky to burn. Both of these old coals are found in the Alleghany Mountains, which are much older than the Rocky Mountains, and very, very much older than these plains.

The Formation of Lignite

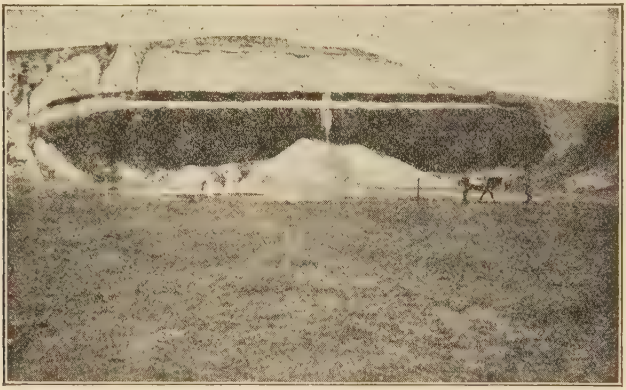
Lignite was formed in more recent ages. It is found quite near the surface, which means that it has not been subjected to such great pressure. For these two reasons it is not hard and heavy. It is easily broken and a ton of it is much larger than a ton of hard coal. We can often see the grain of the wood in it and occasionally we find the imprint of a leaf. Sometimes we find the shell-print of some sea animal.

Since lignite was formed without great pressure it has two qualities which interfere with its usefulness. It contains a large quantity of water, from thirty to forty per cent. It is also porous and when left in the open air for a long time it "slakes" or crumbles into dust. Possible remedies for these difficulties will be discussed farther on.

Our Lignite Deposits

All lignite coal veins lie comparatively near the surface. Some veins are very thin, while others are very thick. At Sand Creek, North Dakota, there is a vein thirty-five feet thick. These deposits sometimes cover a large area. One coal bed, which varies in thickness from five to sixteen feet, extends over an area of five hundred square miles.

These coal beds, as a rule, lie deeper in the central part of the state, at the eastern edge of the great coal field, and shallower in the western part of the state. There the veins come nearly to the surface in some places, and along the river banks and hillsides there are frequent outcroppings. They are especially frequent along the banks of the Missouri and the Little Missouri.



A thirty-five foot coal vein at Sand Creek, N. Dak.

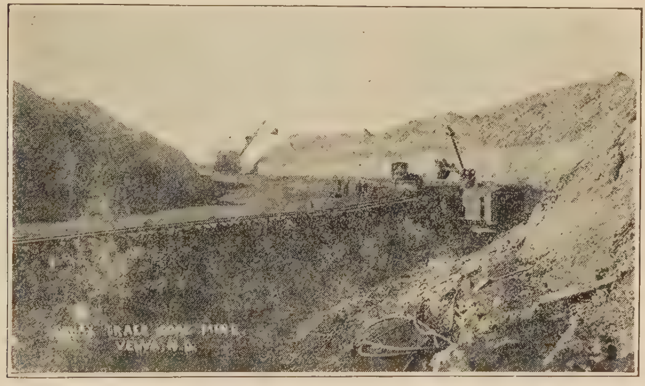
Our Coal Mines

The first coal mine in North Dakota was opened in Medora in 1889. For some years there were very few mines, but after the western part of the state became well settled more mines were opened up, and soon quantities of coal were being shipped to the eastern part of the state. In more recent years many mines have developed. The coal is now in general use in this state and is being shipped to the western counties of Minnesota. A state law requires all state institutions of North Dakota to use it.

There are now many hundreds of mines scattered over the whole western half of the state. Every time a mine is opened up it is necessary to secure a mining license from the state. During the year 1928 alone over two hundred mining licenses were issued.

The Strip Mine

There are two kinds of mines used, according to the depth of the coal vein. When the vein is near enough to the surface so that it pays to uncover the vein from the top, a "strip" or open mine is used. It is practical to strip veins which lie at a depth of thirty to thirty-five feet, but no deeper. The dirt is removed by great steam shovels. Then the coal is taken out in the same way, and dropped into the cars.



The Truax-Traer coal mine at Velva, N. Dak., a good example of a strip mine.

This method has several advantages. It does away with tunneling, which is expensive. It also does away with pumping out water, which is sure to collect in any mine. Furthermore, it is much faster to scoop up the coal in great steam shovels than to dig it out of tunnels with pick and shovel.

The Tunnel Mine

When the coal lies deeper than thirty-five feet it does not pay to remove the surface dirt and make a strip mine.

The Washburn Lignite Company's plant at Wilton, N. Dak. This is the largest tunnel mine in the state.

It is considered better, then, to tunnel in, pick or blast the coal from the vein and haul it out on a small-guage railway built into the mine for that purpose. Most of the mines toward the eastern side of the great coal field, where the coal lies deeper, are of the tunnel type, while in the western part of the state strip mines are more common.

The Advantages of Lignite

There is probably a great future for the mining of lignite coal. However, with the many advantages there are a number of disadvantages which must be overcome. Let us look first at the advantages. The following are the chief advantages of lignite in this state as compared with other kinds of coal: 1. There is a vast quantity of it. 2. It is near the surface and easily mined. 3. There is an extensive market in the neighboring states, because anthracite and bituminous coals, which give greater heat, have to be shipped from Pennsylvania. 4. Lignite is a "smokeless" coal and much cleaner than most other coals to handle. 5. It burns with a fine, white ash. 6. It holds fire for a long time. 7. It is easy to kindle.

The Disadvantages of Lignite

With these advantages there are some disadvantages which must be overcome before the future of the lignite industry is established. 1. Lignite contains a high percentage of water, from 30 to 40 percent. This reduces its heating value because it takes considerable heat energy to drive off this water as the coal burns.* 2. When the coal is shipped it is necessary to pay freight on this water content.

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*Note. The heating value of coal is measured by what engineers call "B. T. U." (British Thermal Units). A "B. T. U." is the heat required to raise the temperature of one pound of water one degree. Lignite has from 6,000 to 7,500 B. T. U.'s per ton. Anthracite, or hard coal, has about 14,000 per ton. Thus we see that a ton of hard coal will produce about twice as much heat as a ton of lignite, and, since we buy coal for the heat it gives us, hard coal is worth about twice as much per ton.

For this reason it does not pay to ship it more than 200 miles from the mine. Thus the possible market is limited to a comparatively small area. 3. Lignite is porous and when left in the open air will "slake" or crumble into dust.

Our Coal Problem

Therefore, the problem facing the coal industry in this state, is to find a practical process which will drive the water out of the coal, thus raising its heat value, and which will also fill up the pores so as to prevent slaking. This process must be inexpensive, so that the improved coal will still undersell anthracite. It must be done at the mine, for each power plant and home could not have such a process. It must be done, also, without the construction of a large, expensive plant, so even the small mines can afford the process.

When this problem is solved we will have a large market. We can ship coal as far east as Chicago, as far south as St. Louis, and as far west as Spokane. Then North Dakota will take a leading place among the coal producing states of the Union.

Briquetting

For a generation scientists have tried to solve the lignite problem by briquetting the coal. The late Dr. Babcock of the University of North Dakota spent a large part of his life experimenting with this method. Several companies which were organized for this purpose have failed. They were able to take out the water and other waste materials. The briquettes they produced had a high heat value and would not slake, but the process used was too expensive. They could not compete with imported coal.

Recently a large plant has been built at Lehigh, North Dakota, at a cost of nearly one million dollars. It uses what is called the "Lurgi process" of briquetting at a low temperature. How well it will be able to compete with imported coal and other processes of treatment remains to be seen. At present this is the only briquetting plant in the state.

Pulverizing

The only method of improving lignite which has proved itself commercially practical so far is that of pulverizing. The coal is ground at the mine into small particles like gravel and shipped to power plants in that form. Large automatic stokers there feed it to the furnaces. Pulverized coal thus has the advantage of being used in automatic stokers, which save shoveling.

A Minot man has recently invented an automatic stoker for home furnaces which makes it possible to use pulverized coal in the home, thus doing away with much disagreeable furnace tending. This stoker is operated by electricity and controlled by a "thermostat" or heat regulator. It feeds coal only as it is needed and shuts the furnace off when the house is warm enough.

Oiling

A process of oil treatment has been perfected recently which gives great promise, but it has not as yet been developed commercially. The coal is run through a vat of hot oil. This drives off the water in the form of steam. Then the oil is taken off by evaporation, except enough to fill the pores, which prevents slaking. The oil is thus used again and again. The process raises the B. T. U's. to over 12,000 per ton, nearly as great as that of hard coal, and is said to be inexpensive.

The men who developed this oiling process have succeeded in making coke from lignite. This, however, has not as yet been developed beyond the "laboratory" stage.

In the light of recent inventions and with these later processes under way there seems to be considerable doubt as to whether briquetting is the best method of solving our coal problem. Next to the fertility of our soil, coal is our greatest natural resource. A great deal of study and money should be spent to develop it properly.

CHAPTER XVI

CLAY, BRICK AND POTTERY

Three Kinds of Clay

North Dakota is rich in the possession of great deposits of valuable clays. There are three kinds, each especially adapted to its particular use, corresponding to the three natural divisions of the state. The silt clay of the Red River Valley, deposited by the waters of old Lake Agassiz, is well suited to the making of brick. The central drift plain has immense deposits of a glacial clay which is well suited to the manufacture of brick, tile and other building materials. The pure white clay found extensively in the Missouri Plateau, called "Tertiary" clay, makes the very finest pottery. This tertiary clay is by far the most valuable and for that reason deserves our special attention.

The Origin of Common Clay

We have seen that one kind of clay was deposited by the glacial lakes, and another kind was left by the great ice sheet or ground up by it from native rocks as it passed over the state. This is somewhat difficult to understand until we look more closely into the process.

Clay comes from the decomposition of rocks. Some rocks decompose into clay; others form other kinds of soil, depending upon their composition. These rocks are broken up first by mechanical agencies, such as frost, sudden changes of temperature, the grinding of glaciers, lightning, etc. Then the chemical action of air, water and vegetable acids completes the decomposition. Sudden changes of temperature cause rocks to expand and contract rapidly, the exposed surface of the rock contracting and expanding more rapidly than the inner or buried portions. This causes the rocks to crack. Then rain or surface water fills the fissures. When this water freezes it expands with great force and the rock breaks like a glass jar or bottle filled with freezing water.

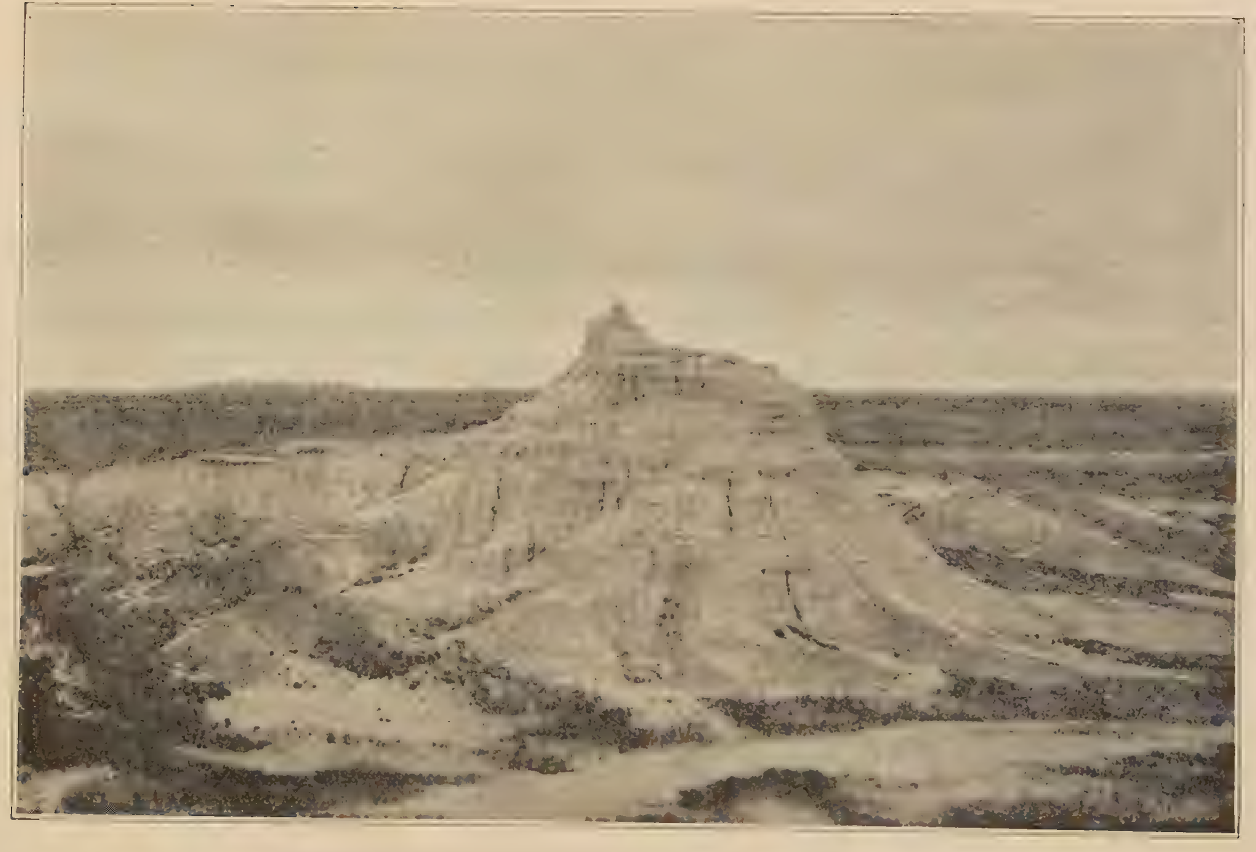
When broken up, the rocks are more exposed to the action of the air and water. Some rocks are eaten up by the oxygen of the air and the oxygen and hydrogen of the water very much as iron rusts. Then the many acids formed in surface waters by the solution of various minerals and plants help in the process of decomposition.

Most clays have been formed in this way through the ages. Other clays have been deposited by large bodies of water, the rock particles and kaolin settling to the bottom. Kaolin is the material that makes clay sticky.

Tertiary or Pottery Clay

The tertiary clays found in the southwestern part of the state were deposited in deep, clear water when that part of the state was covered by the ocean. Outcroppings of this clay occur well scattered over the western half of the state, but they are thicker and whiter in the neighborhood of Dickinson and just north of there, though there are many excellent deposits around Hebron and farther to the southwest. The great beds of tertiary clay always occur at a high elevation, always between 2,450 and 2,600 feet above sea level. They thus have a maximum thickness of 150 feet. These tertiary deposits cover an area of about four thousand square miles and are remarkably uniform in both appearance and composition.

It is this fine, white clay which is so valued for ornamental brick and pottery. There is no better pottery clay found anywhere. The department of ceramics at the University of North Dakota has been working with this clay for a number of years. They have not only succeeded in making some very beautiful pottery, but they have proved



White Butte—a solid mass of white clay. (Photo by Russell Reid) that the tertiary clay of our state will make as good pottery as is found anywhere in the world.

Mining the Clay

It is not difficult to get clay from the ground for the manufacture of either brick or pottery. The deposits usually lie just underneath the surface or outcrop in banks along the rivers and buttes. Two methods are used, stripping and quarrying.

Most brick clays lie just below the surface soil and are secured by stripping off the surface loam. The clay is then easily dug out with pick and shovel and hauled to the nearby plant in wheelbarrows or carts.

When the clay desired outcrops in a bank the plant is usually located at the foot of the bank so that the clay can be run into the plant by gravity. The bottom of the bank is then cut into and the clay slid into the plant in chutes. Then the upper layers are broken down with picks or by blasting as the clay is needed.

In some cases clay is mined far below the surface, but this method is very expensive. It is used only where the clay can be mined in connection with coal, as at the Washburn mine at Wilton.

Preparing the Clay

The ways of preparing clay for manufacture into brick or pottery vary considerably according to the nature of the clay and the size of the plant. As a rule, the clay freshly dug is spread out in beds a few feet deep to "weather" in the sun, rain and wind. In this way it dries out and crumbles somewhat, thus becoming easier to handle. In the larger plants it is then "crushed", then "rolled" and finally "pulverized" into a powder by heavy machinery.

There is an inexpensive method of preparing clay called the "wet method." By this plan the clay is broken up and mixed with water, all in one process, in "soak pits" dug into the ground. This is a slower method and does not make as good brick, but is used in manufacturing on a small scale.

Making Brick

In this powdered form the clay is "mixed", if several grades of clay have to be combined. If it is to be moulded into the form of brick, tile, shingles, etc., as is usually the case, it must be worked into a paste with water. This process is called "tempering", and is done in what is called a "pug mill". Then it is shoveled into a brick machine which moulds it into the form desired, ready for baking. In some plants the powdered clay is not mixed with water and moulded, but is "pressed" in a slightly moist condition in heavy brick presses.

Both moulded and pressed bricks must be dried before they are baked. This is necessary to prevent cracking and crumbling. Drying is done in either open or covered yards or on "drying floors". In large plants it is done by forcing warm, dry air through a "tunnel drier" in which the bricks are corded on cars.

When dried, the bricks are piled in great ovens called kilns and baked. These are of many kinds but the most common are round with a dome-shaped roof, like an inverted kettle. They are about twenty-five or thirty feet in diameter and ten or twelve feet high in the middle. They usually hold from 50,000 to 100,000 bricks.

The Future of the Brick Industry

The future of the brick and tile industry in this state is promising. This is seen by its rapid growth. Several facts make North Dakota well suited to the manufacture of brick and tile. First, there is an inexhaustible quantity of excellent clay, easy to get at. Second, there is with the clay an inexhaustible supply of coal, which will furnish cheap power for its manufacture. Third, the rapid development of all industries in this northwest country is sure to furnish a market for brick and tile. Fourth, the scarcity of timber on these prairies makes lumber expensive, giving a better opportunity for the sale of brick. Fifth, brick is heavy and expensive to ship in from other states, thus giving our own brick plants the advantage of our home market.

There are many things that can be made from North Dakota clay. They are building brick, facing brick, fire brick, sewer tile, drain tile, roofing tile, shingles and all kinds of earthen ware and pottery.

It is not possible to get recent figures concerning the extent of the brick industry in this state, but it is well known that the number of plants and the amount of their output are increasing rapidly.

Pottery

The manufacture of pottery has not as yet become an industry in North Dakota. At the School of Mines in Grand Forks they have made pottery extensively and of various kinds, even the very finest to be found. From this we know definitely that our North Dakota clays will make the very best of pottery. However, as yet the industry has not been placed upon a commercial basis. This is work which requires great artistic ability as well as skilled hands. There seems to be a large market in the cities for this excellent product of our soil. It only remains to interest capital in this great field.

Pottery manufactured in North Dakota from North Dakota clay. (Courtesy of Ceramics Dept. of State University)

CHAPTER XVII

OUR WATER SUPPLY

Its General Distribution

North Dakota has an abundant supply of good water. The many rivers, creeks, lakes and sloughs, well scattered over the entire state furnished sufficient drink for the vast herds of buffalo and elk before the coming of the white man, and later supplied the stock in ranching days. Today they serve the small herds of the general farmers. Probably from one-half to two-thirds of the farms of the state have a natural water supply for stock. Aside from this natural, surface supply, water may be obtained by the proper kind of wells in every part of the state.

Three Kinds of Wells

In digging a well it is very necessary for one to know what kind of well is demanded by the earth structure below the surface. There are three kinds used in the state: the dug well, the Red River Valley artesian well, and the Dakota Sandstone artesian well.

The Dug Well

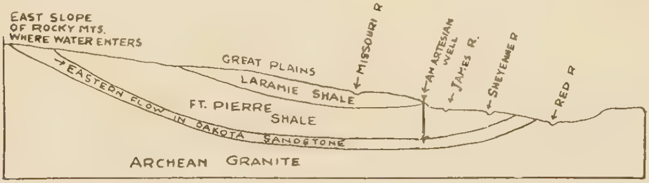
Dug wells obtain their water from layers or seams of gravel or sand which lie from ten to fifty feet below the surface. In wells of this type, when less than thirty feet deep, the water is secured by pumping. If the water comes up in the well within about twenty-five feet of the surface, it can be raised by an ordinary pump. If the surface of the water in the well is deeper than that it must be raised by a force pump, which may be operated by a windmill or engine.

Wells of this type may be obtained in almost any part of the state, except in the eastern tier of counties, which lie in the bottom of the ancient Lake Agassiz. In that region the soil is heavy clay in which the seams of water-bearing sand and gravel within pumping distance of the surface are very few and small.

What Is An Artesian Well?

An artesian well is one in which the water is forced to the surface by natural pressure. Far underneath the surface there are water-bearing strata of sandstone or gravel, lying between an upper and lower layer of shale or clay through which water cannot pass. This water-bearing stratum must lie in a slanting position for many miles and come to the surface in some high country such as the Rocky Mountains, or the Black Hills.

The water enters this stratum where it outcrops, let us say in the Rocky Mountains. From there it makes its way down the sloping stratum to a position many miles from where it entered, and finds itself imprisoned between two impervious layers many hundreds of feet below the surface. Behind it is the weight of many miles of water which forms a terrific pressure. When this stratum is tapped by drilling down from the surface, through the layer of shale which holds it confined, the water is forced to the surface and, many times, far into the air.



This diagram shows how an artesian well is formed.

There are three conditions that are necessary to an artesian well. 1. The water-bearing stratum must be confined between two impervious layers. 2. The stratum must receive its supply of water from some region much higher than the top of the well. 3. The stratum must slant from the water source to the well.

The Red River Valley Artesian Well

The water which supplies the artesian wells of the Red River Valley lies in strata of sand and gravel at a depth of from 250 to 400 feet. These strata come to the surface in the hilly region of western Minnesota. They receive their water there and, slanting westward as they do, they carry the water far below the Red River to a position underneath our eastern tier of counties. The water is held within these strata of sand and gravel by heavy beds of clay both above and below until it is released by the drilling of a well. As a rule this water is fresh and good for all purposes.

The Dakota Sandstone Artesian Well

The artesian wells over nearly the whole state, excepting the Red River Valley, get their water from a layer of Dakota sandstone. This layer or stratum of sandstone has its outcropping and gets its water from the base of the Rocky Mountains. From there it dips downward toward the east and north, extending in that position underneath nearly all of North and South Dakota. It slopes downward toward the north as well as toward the east, being only 330 feet below the surface at the southern boundary of South Dakota, 1,075 feet at the southern boundary of North Dakota and 1,500 feet at Devils Lake.

The water in the Dakota sandstone is held there by heavy strata of clay both below and above. It tries to flow eastward and northward and has a terrific "head" or pressure, caused by the many hundreds of feet of water pressing upon it from behind. Wells drilled into this sandstone in the northern half of South Dakota and in the southern half of North Dakota thus have a strong pressure. Those farther south are too shallow and those farther north are too deep to get a rapid and forceful flow.

Since the Dakota sandstone was deposited by the sea when it covered this part of the continent it is permeated with the salt of the sea water.* Therefore the artesian water which comes from it is usually salty, brackish or alkali. As a rule it is not very good for people to drink but may be used for stock. Sometimes it is very bitter, or as salty as brine. It may be "hard" or "soft" according to the kind of salt it contains.

It is probable that the Dakota Sandstone does not underlie the northeastern corner of the state. A well drilled at Grafton did not strike into the Dakota Sandstone, but obtained water at a lower depth from a stratum of sandstone lying next to the Archaean Granite.

(Courtesy of N. P. Ry.)

An artesian well in Richland County.

This wonderful supply of water over the entire state has been a great blessing. It has enabled the people to develop the agricultural resources, furnishing water for themselves and their domestic animals. The cost of drilling a well is not so great but that any farm that is worth developing may have one.**

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*Note. While this layer of sandstone was level when deposited, the western part of it was elevated when the Rocky Mountains were thrust up from below.

Irrigation

Sometimes we find large tracts of level land lying next to a permanent supply of water in such a way that the land can be irrigated and its crops rendered independent of rainfall. In such places crops can be raised with practical certainty.

There are two irrigation projects in North Dakota. They are close together, near the junction of the Yellowstone and Missouri rivers in the northwestern part of the state.

The Lower Yellowstone Irrigation Project

The larger of these irrigated areas is known as the Lower Yellowstone Project. It lies in the flat bottom land near the mouth of the Yellowstone River, partly in Montana and partly in North Dakota. The water supply is obtained from the Yellowstone River. The water is held in reservoirs and let out over the level plain as needed through a network of ditches, from which it seeps into the soil.

By this system of irrigation the supply of moisture in the soil can be regulated carefully, making it possible to grow immense crops with a certainty that removes most of the risk of farming. The chief crops grown in this way are alfalfa, wheat, oats, flax and potatoes.

The North Dakota Pumping Project

The second irrigation undertaking is known as the North Dakota Pumping Project. It extends northward from the city of Williston in the valley of the Little Muddy River. Three thousand acres are now being irrigated, but it is

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**Note. Sometimes it is not possible to get a flow from an artesian well. This is usually because the sandstone at that place is very hard and therefore contains little water, thus rendering the pressure too weak to bring the water to the surface.

estimated that the plant is sufficient to supply water to twelve thousand acres.

This project is the only one operated by the federal government in which the water is pumped into the ditches. Ordinarily very expensive, it is made possible at this place by the presence of lignite coal which is used for power. A power plant is located at the coal mine, some three miles north of the Missouri River. Electric power from this plant operates several pumping stations which are located on barges in the river. These pumping stations force the water up on the level plain where it flows back through ditches to irrigate the fields.

There are many other places in the state where many hundreds or thousands of acres could be irrigated, making it possible to raise very large crops with practical certainty.

CHAPTER XVIII

OUR NATURAL RESOURCES AND MANUFACTURES

Aside from the three great natural resources of North Dakota, the soil, the coal and the clay, there are several minor resources which, though not as valuable, are of great help in the development of the state.

Building Materials

The state has immense quantities of sand, gravel and sandstone, so useful and valuable as building material. In some parts, especially about Kenmare, there is an excellent grade of sandstone. Many public buildings, as well as private homes, have been constructed of this stone.

Deposits of sand and gravel are very common over the state, especially in the eastern half. They are very valuable in the construction of concrete foundations, paving, sidewalks, roads, railroads and bridges. If it were necessary to import gravel and sand from other states, the construction of all these things would be much more expensive. Our excellent system of graveled roads would then be impossible because of excessive cost.

Metals

While there is a sprinkling of many different hard minerals in the state it is not probable that any of them exist here in commercial quantities. Gold, copper and lead have been found in small particles scattered through the glacial drift, in which they were carried down from the far north. However, these metals were not formed here. If they were, our whole science of geology is wrong. What little of these metals is here was brought in from the outside, and is so scattered as to be worthless. Many people have thought and claimed that they have found gold here, but it always turned out to be iron pyrite, called "fool's gold."

Some small seams of real iron ore of good quality have been found in the western part of the state but not as yet in paying quantities. Gypsum is well scattered over the state but has not been found in paying quantity in any place. So far as minerals are concerned North Dakota will have to be contented with its vast deposits of coal and clay and the great quantity of aluminum found in the tertiary clay. The fact that this clay contains from 20 to 36 percent aluminum makes it very valuable. Before many years commercial aluminum may be manufactured from these North Dakota clay beds. It is now made from bauxite, which is imported from France for this purpose.

Electric Power

Because of the absence of swift rivers and waterfalls North Dakota is not supplied with water power. It will have to develop its power from its vast fields of coal or bring it in from Minnesota.

One of the power plants of the Ottertail Power Company

At present many cities of the state manufacture their own electric power in their own coal-burning plants. This is especially true in the western part. The eastern half of the state secures most of its power from the Ottertail Power Company at Fergus Falls, Minnesota. This company's lines cover the eastern half of the state and serve 182 North Dakota cities and villages, as well as 82 in Minnesota and 20 in South Dakota.

This company is the largest of its kind in this part of the northwest. Its growth has been rapid. Organized in 1907, it now has 1,200 miles of lines. Its three plants on the Ottertail River develop 3,000 horse power.

In the western part of the state the Montana-Dakota Power Company is furnishing power to many places. Its lines run as far north as the Canadian line and nearly as far east as Minot. The source of this power is a large gas field extending from Glendive, Montana, in a southeastern direction into South Dakota.

This company, in addition to its power lines, expects to furnish gas for heating and lighting to cities and villages within a radius of several hundred miles. It is now furnishing gas to Miles City, Glendive and Terry, Montana, and Marmarth, North Dakota. It has bought the local gas plants at Mandan, Bismarck and Valley City and expects to run a pipe line from Beach to Fargo and serve all the intervening cities and villages along the main line of the Northern Pacific.

This company seems destined to furnish power and gas to the whole western half of North Dakota.

The State Lands

Of the lands set aside by the enabling act for the support of the public schools and the state institutions, a large proportion has been sold, but there still remains about a million acres. This land may be purchased by anyone at public auction. The sale price must be at least ten dollars per acre and not more than 160 acres will be sold to one person. The purchaser must be a citizen of the United States.

The terms of sale are liberal. The purchaser may pay as little as one-fifth of the price in cash and the balance in five, ten, fifteen and twenty years. There is a recording fee of $5 for each contract and unpaid balances draw interest at six percent, payable yearly in advance.

Thousands of our farmers got started through this liberal land policy and have become prosperous. Others may still take advantage of it, though, naturally, the best land has been taken.

Oil and Gas

It seems very probable that there must be great quantities of oil and gas in the western part of the state, but as yet they have been found only in small quantities in scattered places. Both gas and oil are formed in connection with coal deposits, though as a rule they have been found in coal that has a greater oil content than our North Dakota lignite. Yet, in eastern Montana, where the geological formation is exactly the same as in the western part of our state, there are great quantities of both gas and oil.

Much money has been spent in drilling for both of these products in this state, but no finds of importance have been made. Yet their existence is so probable that drilling will undoubtedly continue, and it is to be hoped that effort along this line will finally be rewarded. It is generally conceded that we cannot hope to find these products in the eastern half of the state, because we know that the coal fields are limited to the western half, as shown on the map.

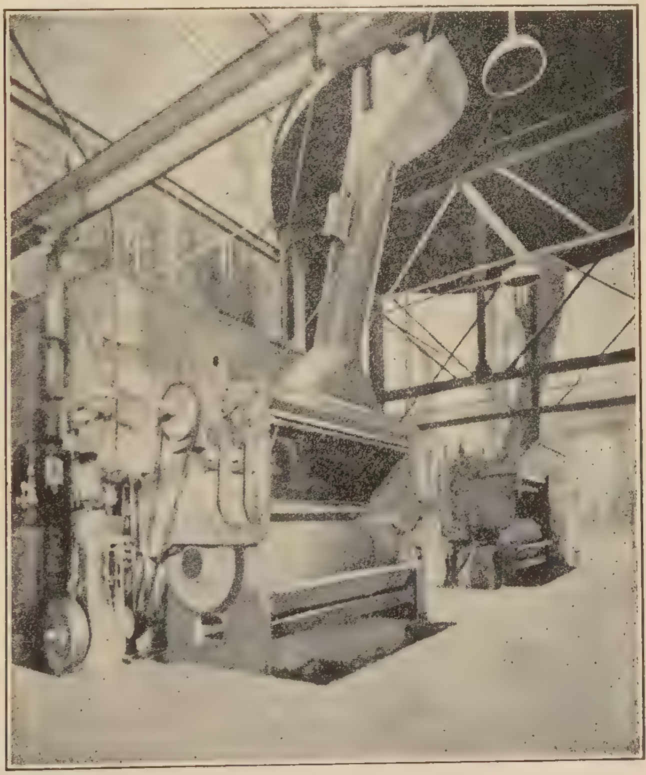
Manufactures

North Dakota is not regarded as a state important for its manufactures, yet the progress that has been made in manufacturing in many lines is surprising and gives promise for the future. So far our manufactures have been limited to the preparation of our chief raw materials, grain, livestock, coal and clay, and it is probable that these materials will continue to make up the great bulk of our manufactured products, flour, meat, coal and brick. However, several minor products are being added from time to time.

We have noticed the methods of mining coal and the making of briquettes, also the mining of clay and the manufacture of brick and pottery. Let us look at some of the larger factories where these and other products are produced.

The Lehigh Briquetting Company

A million dollar briquetting plant has been built at Lehigh, North Dakota, just a few miles east of Dickinson.



The engine room of the Lehigh Briquetting Company's plant.

This immense plant opened and began the briquetting of lignite coal in the spring of 1929. It uses the Lurgi process, what is popularly called the "German" process of briquetting at a low temperature. It has a capacity of one hundred tons of briquettes a day, and it expects to build three more carbonizers, which will make its capacity four times as great. It is hoped that the product of this plant will thus replace at least a small part of the ten million tons of anthracite coal imported from Pennsylvania every year by the states of North Dakota and Minnesota. The plant also expects before long to manufacture pottery and aluminum from the high grade tertiary clay of that region.

This plant is built entirely of steel, concrete and brick and is equipped with the best and most modern machinery. Everything is automatic. No human hand touches the coal in the whole process of manufacture, from the time it is taken from the ground until the briquettes are loaded on cars and shipped. A well equipped laboratory tests the fuel, oils, tar and gasses, in order to use all byproducts.

It is hoped that this great plant, owned almost entirely by North Dakota people, has found a way of making our lignite coal compete with the anthracite and bituminous coals of Pennsylvania.

The Washburn Lignite Company

One of the oldest and largest mines in the state is located at Wilton, North Dakota. This mine, owned by the Washburn Lignite Company, is a deep one. All the coal is mined far underneath the ground, is brought to the elevator on a narrow gauge railway and elevated to the surface.

The Washburn Lignite Company's property covers about 2,800 acres and is valued at $900,000.00. They hire about 250 men and produce over 200,000 tons annually, which sells at $1.60 per ton at the mine. Practically all of this output is shipped over the Northern Pacific and Soo Line railways to the cities and villages in the eastern half of North Dakota.

Miners at work in a tunnel mine far below the surface

The Truax-Traer Company

The largest mine in the state is a strip mine located at Velva. It is operated by the Truax-Traer Company of Minneapolis. This mine is shallow but contains a very thick vein of high grade lignite. The deposits extend over a large area. Its output is about 335,000 tons annually, valued at $600,000.

Large steam shovels move along on a track and scoop up the overlying earth, moving more than a ton at each shovelfull, thus laying the coal bare. Then other steam shovels scoop out the coal in the same way and load it into cars. At the plant it is broken up in great crushers and sorted by screens as it is run into cars to be shipped. This mine was the beginning of the great Truax-Traer

Company which now operates in many places in the United States and is now capitalized at $22,000,000.

Loading coal with a steam shovel at the Truax-Traer mine.

The Hebron Brick Company

The Hebron Brick Company has the largest brick plant in the state. As the name implies, it is located in the western part of the state at Hebron. This company was organized in 1903 and has grown rapidly.

The plant, which cost $85,000, is about 600 feet long by 400 wide. It operates sixteen kilns, fueled by gas, and ships about 500 carloads of brick per year. From the fact that each car contains about 15,000 bricks, you can figure out the number of bricks made in a year.

The product of the company consists of ten varieties of face brick, in different shades, fire brick, building, roofing and silo tile.

The company owns its own deposits of clay and coal, consisting of about 1,600 acres of land. The pit now being worked is about 600 feet wide and 40 feet deep. The clay is mined by a gasoline shovel and is taken to the plant on a narrow gauge railway. The company sells a large part of its product in North Dakota but some of it is shipped as far west as the Pacific coast. It pays the people of Hebron about $80,000 per year for labor.

The Dakalite Products Company

Dakalite is named from Dakota and lignite. It is a dye, discovered by Dr. L. P. Dove of the state university. It is used in staining wood. It is manufactured from lignite coal and is the only dye, stain or paint being thus manufactured. Its advantage lies in its convenience. All that is necessary is to mix it with water and it is ready to use. Later developments of the same dye are mixed with oil and are used as both stain and oil filling.

The Dakalite plant is located at Burlington, just west of Minot. It is a well organized and busy place, running day and night. The future of this Dakota-born industry is assured. Dakalite has been adopted as the most desirable stain by the New York City schools and by many leading furniture factories.

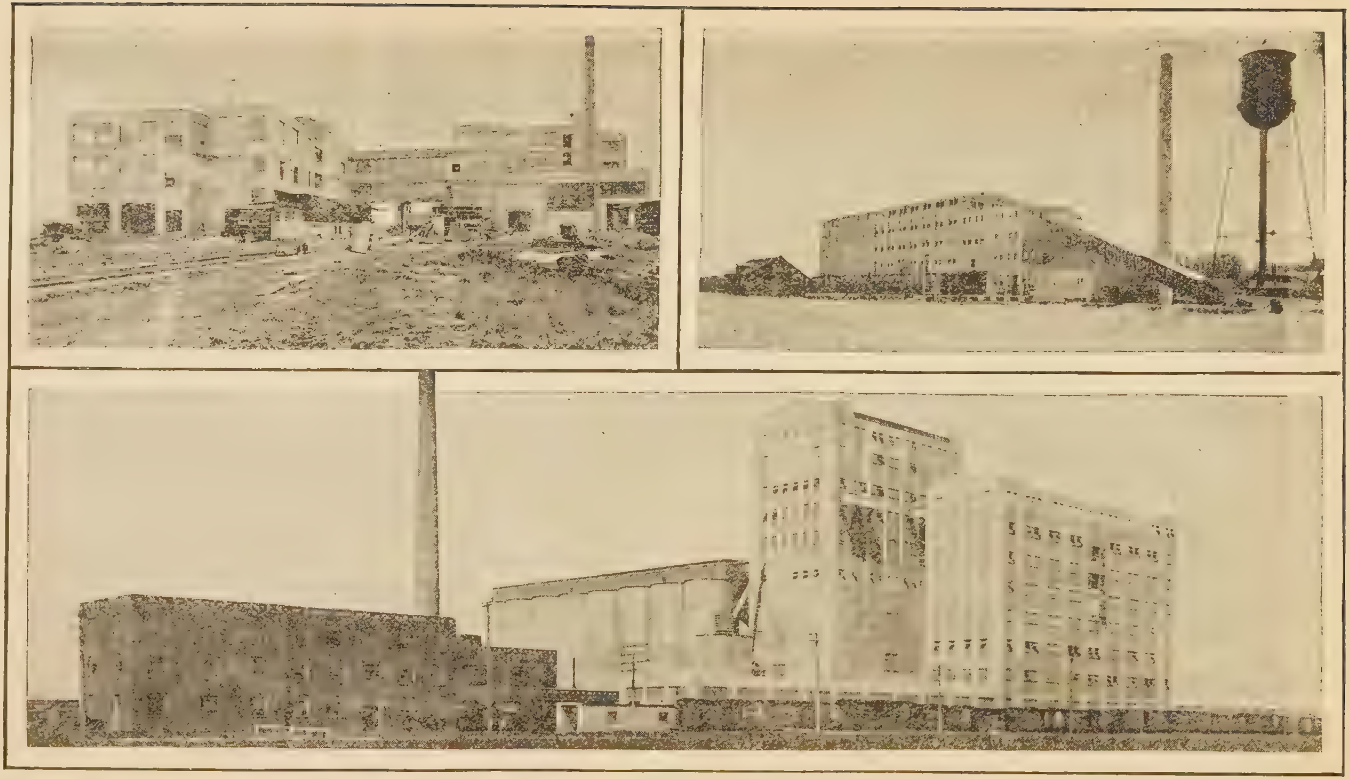
The State Mill and Elevator

In 1922 the State of North Dakota built a state-owned flour mill and elevator at Grand Forks. It is a large plant, constructed entirely of steel and concrete and is equipped with the best and most modern machinery.

The state mill manufactures the "Dakota Maid" flour, producing about 200,000 barrels per year. It grinds in a day more wheat than can be grown on 1,000 acres of land in a season. The elevator has a storage capacity of two and one-half million bushels of wheat. The mill is, at the present time, managed under the direction of the governor.

The Russell-Miller Company

The largest manufacturer of flour in North Dakota is the Russell-Miller Milling Company, whose central office and principal mills are in Minneapolis. This company operates seven large flour mills in this state. They are locat-



(Courtesy of G. N. Ry.)

(Top Left) Northern Packing Company's plant at Grand Forks. (Top Right) Armour and Company's plant at West Fargo. (Bottom) State Mill and Elevator at Grand Forks.

ed at Valley City, Jamestown, Grand Forks, Minot, Bismarck, Mandan and Dickinson. They make the well-known brand of Occident flour, made entirely from hard spring wheat grown in the northwest. The Occident Elevator Company, owned entirely by the Russell-Miller Company, has seventy-one elevators in this state.

The Russell-Miller Company and its subsidiary companies operate two mills and sixty-five elevators in Montana and have large terminal mills and elevators in Minneapolis, Duluth and Buffalo, New York. This company has manufactured flour in this state for fifty years, and its sales in the state now amount to several hundred thousand barrels.

The Fairmount Creamery Company

There are many cooperative and independent creameries in North Dakota. The largest company doing business in this state is the Fairmount Creamery Company, named after the town of its birth, Fairmount, Nebraska. It has twenty-two plants in the United States, one of which is located at Devils Lake, North Dakota.

This company pays the farmers of this country about $20,000,000 per year for their cream, eggs and poultry. It manufactures butter, cheese, and ice cream, and ships the eggs and dressed poultry to the larger cities. It has done much for this state in showing the farmers the best cattle and poultry to raise, the best methods of feeding and caring for diseases, the best methods of growing clover and alfalfa and the building of silos.

Armour and Company

The Armour and Company packing plant, the largest of its kind in the state, is located at West Fargo. It makes a convenient market where the farmers of the state can sell their livestock and save the long-haul freight rates to other markets. For many miles around farmers haul their livestock to the plant by truck and pay no freight at all.

This large plant employs an average of 250 men at a cost of over $300,000 per year. Every year it pays the farmers of this state about $7,000,000 for livestock. The heavy run of the plant is on cattle and calves in the summer, sheep in the fall and hogs in the winter. Its weekly kill is about 400 to 700 cattle, 400 to 800 calves, 500 to 2,500 sheep, and from 3,000 to 10,000 hogs. This industry is a decided economic asset to our state.

Our Newspapers

Every county seat and almost every village of 800 or more people has its newspaper. In the election, every two years, the people of each county select their "official newspaper" in which the legal advertising of the county must be done.

The larger cities have the largest newspapers, which bring the world's news to the home and office twice a day. Among these large papers are the Bismarck Tribune, the oldest paper in the state, the Fargo Forum, the Minot In-

The Fargo Forum building.

dependent, and the Grand Forks Herald. Aside from furnishing news to the people these papers have been a great political force in the state for two generations.

Let us look at the business side of one of these great newspapers. The Fargo Forum, our largest newspaper, has a daily circulation of 30,000. In a year it uses about 2,000 tons of paper and nearly two tons of ink. Its type is set on eight Linotype machines and the largest press will turn out 30,000 twenty-four page papers complete in an hour. This paper has a working force of 125 people, besides 250 carriers and newsboys, and has a payroll of a quarter of a million dollars annually.

In 1926 the Fargo Forum built and occupied one of the finest and best equipped newspaper plants in the northwest. The paper has always been very active and generous in its support of civic improvements and social welfare.

One of North Dakota's excellent highways—in the Badlands.

CHAPTER XIX

RAILROADS AND HIGHWAYS

While North Dakota is a large state and the population greatly scattered, the state is fortunate in being well served by railways. Three transcontinental railways cross the state and their many branches penetrate to every county and to almost every village. There are only a few communities which are far removed from a railroad.

The Northern Pacific

The Northern Pacific Railroad, the first road to be built in North Dakota, crosses the state from east to west, from Fargo through Valley City, Jamestown, Steele, Bismarck, Mandan, Dickinson, Medora, and Beach. Its branches cover the southern half of the state, bringing lumber, machinery, clothing, hard coal and all kinds of manufactured goods to our people, and taking our agricultural products back to the eastern markets. Trace the main line and branches on the map on page 120.

The Great Northern

The Great Northern Railroad, the road which James Hill built from the Twin Cities to the Pacific coast, crosses our state from southeast to northwest. This great railroad is the largest in the state. Its 2,000 miles of road within this state covers the Red River Valley and the whole northern part of the state. Through its whole history this road has done much to introduce purebred horses and cattle and the best farm crops and methods of farming. Trace the main line and branches on the map.

The Soo Line

The Chicago, Milwaukee and Sault Saint Marie Railroad, popularly called the "Soo", extends through North Dakota from the southeast to the northwest, passing through Hankinson, Enderlin, Valley City, Carrington, Minot, and Portal. It is a part of the great Canadian Pacific system. Its branches permeate the central, southern, southeastern and northeastern parts of the state. Trace the main line and branches on the map.

Aside from these great transcontinental roads, the Chicago, Milwaukee and St. Paul, popularly known as the "Milwaukee", extends down the Red River Valley from Wahpeton to Fargo, and also from various points in South Dakota to points in the southern part of North Dakota, including Cogswell, Edgeley, Linton and McKenzie, Mott, New England, Hettinger, Bowman and Marmarth.

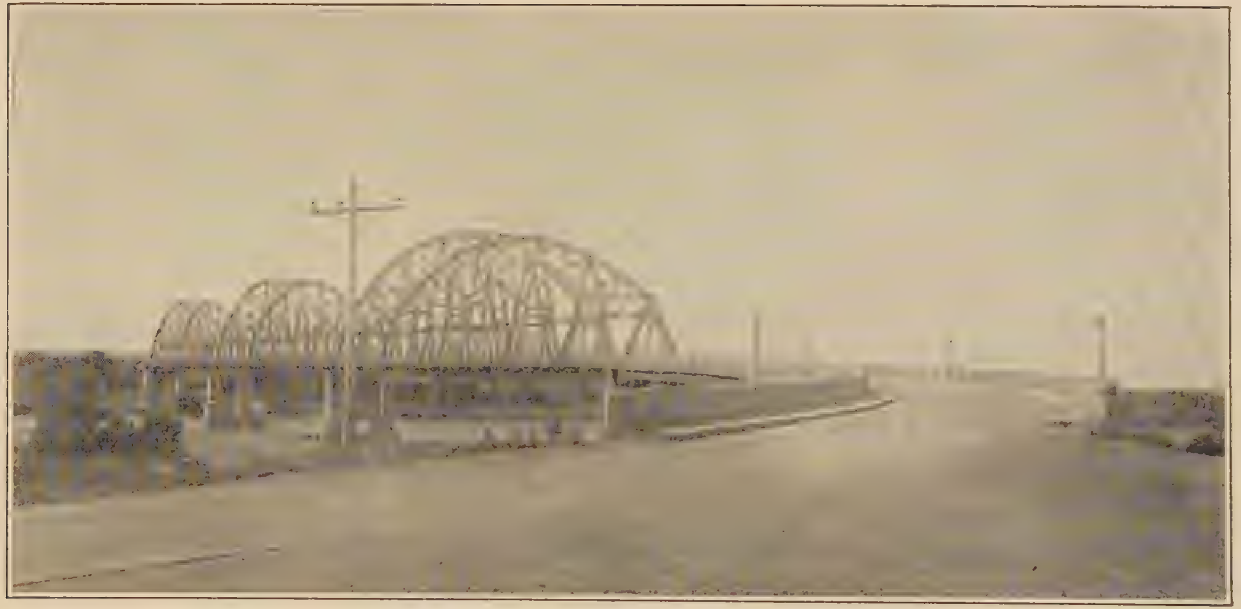
There is one railroad entirely within the state, the Midland Continental, which extends from Wimbledon southward through Jamestown to Edgeley.

These railroads handle both the passenger and freight traffic of North Dakota efficiently and well, giving good service and charging rates as low as can be expected for such long distances. Both their freight and passenger rates are fixed by the Interstate Commerce Commission. The taxes they pay help materially in the support of our state government.

In the summer season, the three transcontinental lines, the Northern Pacific, the Great Northern and the Soo, run many long excursion trains through to the Pacific coast, enabling thousands of tourists to enjoy the three most famous scenic spots of North America, Yellowstone Park, Glacier Park, and the Canadian Rockies.

Highways

Road building in North Dakota has been a difficult task. It is a large state with a small and scattered population. With 106,000 miles of road and only 650,000 people, it is



(Photo by Russell Reid)
The Liberty Memorial Bridge across the Missouri River between Bismarck and Mandan, North Dakota.

evident that there must be about a mile of road to every six people. On the average, then, every family must maintain a mile of road. This has been a heavy burden but our people have accomplished it gloriously. North Dakota now ranks third among the states who have received federal aid, in the extent of its improved highways.

Modern road construction really began with the creation of the Bureau of Public Roads and the National Highway System in 1917. The next year about seventeen miles of earth road was graded south of the city of Fargo. By 1922 there was a little over 900 miles of graded earth road in the state, only twenty miles of which was graveled. In 1928 there were over 4,000 miles graded and over 2,000 miles graveled.

This remarkable growth has been made possible by federal aid and by funds obtained from automobile licenses and a three cent tax on gasoline. There are now more than 200,000 automobiles in the state, almost one car for every three people. The truck traffic has increased rapidly in the past few years, which has increased the difficulty of keeping roads in good condition. However, road construction and improvement has kept pace with the increased demands, and North Dakota is justly proud of its wonderful system of improved highways.

Three great highway bridges span the Missouri River. All have been constructed in the past seven years. The Liberty Memorial Bridge was built between Bismarck and Mandan in 1921. It is nearly a half mile in length and cost $1,225,000. It is a beautiful steel and concrete structure. The Lewis and Clark Bridge at Williston and the Verendrye Bridge at Sanish were completed in 1927. Both are steel span bridges. Besides these three structures, two railway bridges cross the Missouri River within this state, the Northern Pacific Bridge at Bismarck and the Great Northern Bridge at Williston.

While the development of aeronautics is just beginning in North Dakota, there is a probability that two regular air routes will eventually cross the state from east to west, one following the Northern Pacific Railway and one the Great Northern Railway. All of the larger cities of the state have their flying fields and their chambers of commerce are doing all they can to secure the establishment of regular air routes through the state.

United States Highways

Five United States highways are routed across or into North Dakota. Number two crosses the northern part of the state, paralleling the Great Northern, east and west from Grand Forks to Williston. Number ten crosses the southern part of the state in the same way, paralleling the Northern Pacific from Fargo to Beach. Number eighty-one passes parallel with the Red River from South Dakota to the Canadian line, connecting Wahpeton, Fargo, Grand Forks, Grafton and Pembina. Number eighty-three comes into Emmons County from South Dakota and meets number ten at Sterling. Number twelve parallels the Milwaukee Railroad in the southwestern part of the state through Hettinger, Bowman and Marmarth.

Revetment work on the bank of the Missouri River to protect the Liberty Memorial Bridge.

Thus we see that these federal highways connect all the cities of the state. They also connect them with the principal cities of our neighboring states. For the most part these federal highways are well graded and graveled, making travel easy at all times of year. Though in the western part of the state there are considerable stretches that are not graveled, they are being completed rapidly, and it will not be many years before all the federal and state trails will be graveled. As yet there are no paved highways in the state outside of the cities.

State Highways

In addition to these federal trails there are fourteen state highways which penetrate to almost every part of the state. Under the efficient direction of the state highway commission these roads are being graded and graveled very rapidly. So general has automobile travel become that it is very necessary that we be as familiar with these main highways as with the railroads.

Traveling Through Our State

On the following pages are tables showing the federal and state trails, the cities and the larger villages through which they pass, and the mileage. You should study these tables in connection with the highway map and work out many journeys to various cities and other places of interest in the state. Plan out the best route in dry weather and in wet weather, compute the distance and time required for the journey, and enumerate the counties, cities and principal villages through which you would pass. Sometimes go by one route and return by another. The following tables were prepared by the Greater North Dakota Association.

A concrete bridge across the Sheyenne River at Valley City.

U. S. Highway No. 2

T. R. Highway

Total Mileage Read Down	Intermediate Mileage Read Down	Towns and Cities	Also on No	Intermediate Mileage Read Up	Total Mileage Read Up	Population
0.0	0.0	Grand Forks ...	81	16.0	394.4	15,168
16.0	16.0	Emerado		6.0	378.4	319
22.0	6.0	Arvilla		6.0	372.4	168
28.0	6.0	Larimore	18	11.0	366.4	865
39.0	11.0	McCanna		13.0	355.4	118
52.0	13.0	Petersburg		6.0	342.4	338
58.0	6.0	Michigan		12.0	336.4	491
70.0	12.0	Lakota	1	4.0	324.4	869
74.0	4.0	Bartlett		6.0	320.4	98
80.0	6.0	Doyon		7.0	314.4	215
87.0	7.0	Crary		13.0	307.4	244
100.0	13.0	Devils Lake	20,19	6.0	294.4	5,409
106.0	6.0	Grand Harbor ..		9.0	288.4	67
115.0	9.0	Penn		9.0	279.4	168
124.0	9.0	Churchs Ferry, a..		12.0	270.4	304
136.0	12.0	Leeds, b		7.0	258.4	668
143.0	7.0	York	30	8.0	251.4	320
151.0	8.0	Knox		16.4	243.4	204
167.4	16.4	Rugby	3	13.0	227.0	1,509
180.4	13.0	Berwick		9.0	214.0	275
189.4	9.0	Towner	14	10.0	205.0	531
199.4	10.0	Denbigh		14.0	195.0	100
213.4	14.0	Granville		15.0	181.0	363
228.4	15.0	Surrey		9.0	166.0	169
237.4	9.0	Minot	6,9	5.9	157.0	12,245
243.3	5.9	Jct. No. 9.......		7.5	151.1	
250.8	7.5	Des Lacs		9.0	143.6	151
259.8	9.0	Berthold	28	11.0	134.6	523
270.8	11.0	Tagus		8.0	123.6	126
278.8	8.0	Blaisdell		7.0	115.6	100
285.8	7.0	Palermo		9.0	108.6	193
294.8	9.0	Stanley	8	7.6	99.6	816
302.4	7.6	Ross		6.0	92.0	219
308.4	6.0	Manitou		8.0	86.0	30
316.4	8.0	White Earth		11.0	78.0	245
327.4	11.0	Tioga	40	14.0	67.0	265
341.4	14.0	Ray		7.0	53.0	557

U. S. Highway No. 81

Meridian Highway

Total Mileage Read Down	Intermediate Mileage Read Down	Towns and Cities	Also on No.	Intermediate Mileage Read Up	Total Mileage Read Up	Population
0.0	0.0	Whiterock, S. D..		10.0	259.5	353
10.0	10.0	Fairmount	11	15.0	249.5	608
25.0	15.0	Wahpeton	13	10.0	234.5	3,187
35.0	10.0	Dwight		10.0	224.5	139
45.0	10.0	Abercrombie		12.0	214.5	257
57.0	12.0	Christine		7.0	202.5	219
64.0	7.0	Hickson		16.0	195.5	79
80.0	16.0	Fargo	10	11.0	179.5	24,921
91.0	11.0	Harwood		8.0	168.5	79
99.0	8.0	Argusville		7.5	160.5	106
106.5	7.5	Gardner	26	8.0	153.0	212
114.5	8.0	Grandin		6.0	145.0	319
120.5	6.0	Kelso		8.0	139.0	30
128.5	8.0	Hillsboro, a......		8.0	131.0	1,162
136.5	8.0	Cummings, a....		8.0	123.0	169
144.5	8.0	Buxton		5.0	115.0	394
149.5	5.0	Reynolds		7.0	110.0	340
156.5	7.0	Thompson	15	13.0	103.0	262
169.5	13.0	Grand Forks	2	11.0	90.0	15,168
180.5	11.0	Manvel	33	12.0	79.0	210
192.5	12.0	Ardock		7.0	67.0	144
199.5	7.0	Minto		10.0	60.0	513
209.5	10.0	Grafton	17	15.0	50.0	2,913
224.5	15.0	St. Thomas		6.0	35.0	443
230.5	6.0	Glasston		7.0	29.0	160
237.5	7.0	Hamilton	5	10.0	22.0	179
247.5	10.0	Joliette	5-44	8.0	12.0	221
255.5	8.0	Pembina	55	4.0	4.0	665
259.5	4.0	Emerson, Man..		0.0	0.0	1,092

a—No. 7 runs west from No. 81 at point seven miles north of Hillsboro and 1 mile south of Cummings.

348.4	7.0	Wheelock		6.0	46.0	104
354.4	6.0	Epping	42	7.0	40.0	157
361.4	7.0	Spring Brook		14.0	33.0	93
375.4	14.0	Williston	85	19.0	19.0	3,948
394.4	19.0	Montana Line ...		0.0	0.0	

a—East Junction Nos. 4 and 2 is 1 mile west of Churchs Ferry.

b—West Junction Nos. 4 and 2 is 5 miles east of Leeds.

U. S. Highway No. 10

National Parks Highway

0.0	0.0	Fargo	81	14.2	370.8	24,921
14.2	14.2	Mapleton		9.0	356.6	191
23.2	9.0	Casselton	18	7.0	347.6	1,416
30.2	7.0	Wheatland		11.0	340.6	519
41.2	11.0	Buffalo	38	5.1	329.6	236
46.3	5.1	Tower City		16.1	324.5	389
62.4	16.1	Valley City ...	9.1	12.0	308.4	4.695
74.4	12.0	Sanborn		12.0	296.4	323
86.4	12.0	Spiritwood		12.0	284.4	250
98.4	12.0	Jamestown	4	19.9	272.4	7,230
118.3	19.9	Cleveland		9.0	252.5	277
127.3	9.0	Medina	30	9.0	243.5	344
136.3	9.0	Crystal Springs .		7.5	234.5	109
143.8	7.5	Tappen		6.0	227.0	210
149.8	6.0	Dawson	3	8.0	221.0	241
157.8	8.0	Steele	3	12.0	213.0	250
169.8	12.0	Driscoll		10.0	201.0	400
179.8	10.0	Sterling	14-83	6.5	191.0	200
186.3	6.5	McKenzie		5.5	184.5	250
191.8	5.5	Menoken		13.0	179.0	50
204.8	13.0	Bismarck	6-34	6.0	166.0	9,150
210.8	6.0	Mandan	6-43	26.0	160.0	5.068
236.8	26.0	New Salem	31	21.5	134.0	786
258.3	21.5	Glen Ullin	49	13.0	112.5	872
271.3	13.0	Hebron		14.0	99.5	1,300
285.3	14.0	Richardton		5.5	85.5	652
290.8	5.5	Taylor		18.5	80.0	248
309.3	18.5	Dickinson	22	19.5	61.5	4,467
328.8	19.5	Belfield		16.0	42.0	489
344.8	16.0	Medora	39	16.0	26.0	125
360.8	16.0	Sentinel Butte ..		8.0	10.0	258
368.8	8.0	Beach	16	2.0	2.0	1,148
370.8	2.0	Montana Line...		0.0	0.0	

U. S. Highway No. 12

Yellowstone Highway

0.0	0.0	Lemmon, S. D....		19.0	120.0	1,600
19.0	19.0	Haynes, N. D.		10.0	101.0	161
29.0	10.0	Hettinger		12.0	91.0	1,009
41.0	12.0	Bucyrus		10.0	79.0	109
51.0	10.0	Reeder	22	7.0	69.0	248
58.0	7.0	Gascoyne		5.0	62.0	74
63.0	5.0	Scranton		6.0	57.0	361
69.0	6.0	Buffalo Springs..		8.0	51.0	75
77.0	8.0	Bowman	85	18.0	43.0	775
95.0	18.0	Rhame		13.0	25.0	290
108.0	13.0	Marmarth	16	12.0	12.0	874
120.0	12.0	Baker, Mont. ...		0.0	0.0	1,100

U. S. Highway No. 83

0.0	0.0	S. D Line		6.0	65.0	
6.0	6.0	Hull	11	9.0	59.0	45
15.0	9.0	Strasburg		10.0	50.0	589
25.0	10.0	Linton	13	8.0	40.0	1,034
33.0	8.0	Temvik		9.0	32.0	175
42.0	9.0	Hazelton	34	14.0	23.0	437
56.0	14.0	Moffit		9.0	9.0	51
65.0	9.0	Sterling	10	0.0	0.0	114

OFFICIAL WARNING SIGN

"**SLOW**" DIAMOND SHAPED WARNS OF AN ACTUAL DANGER

"**STOP**" OCTAGONAL ALWAYS REQUIRES FULL STOP

"**RAILROAD CROSSING**" ROUND PLACED AT GRADE CROSSING ONLY

"**CAUTION**" SQUARE CALLS FOR ALERTNESS-BE CAREFUL

HIGHWAY MARKER

State Highway No. 11

Total Mileage Read Down	Intermediate Mileage Read Down	Towns and Cities	Also on No.	Intermediate Mileage Read Up	Total Mileage Read Up	Population
0.0	0.0	Minn. Line		2.0	193.0	
2.0	2.0	Fairmount	81	15.0	191.0	608
17.0	15.0	Hankinson		14.0	176.0	1,390
31.0	14.0	Lidgerwood		11.0	162.0	1,009
42.0	11.0	Cayuga		14.0	151.0	204
56.0	14.0	Forman	9	7.0	137.0	356
63.0	7.0	Cogswell		17.0	130.0	430
80.0	17.0	Oakes	1	11.0	113.0	1,509
91.0	11.0	Ludden	1	21.0	102.0	154
112.0	21.0	Ellendale	4	42.0	81.0	1,094
154.0	42.0	Ashley	3	34.0	39.0	962
188.0	34.0	Hague		5.0	5.0	329
193.0	5.0	Hull	83	0.0	0.0	45

State Highway No. 6

0.0	0.0	S. D. Line		9.0	262.4	
9.0	9.0	Selfridge		25.5	253.4	250
34.5	25.5	Brein	21	16.0	227.9	46
50.5	16.0	St. Anthony		15.0	211.9	143
65.5	15.0	Mandan, a	10	6.0	196.9	5,068
71.5	6.0	Bismarck	10	18.4	190.9	9,150
89.9	18.4	Baldwin		9.6	172.5	134
99.5	9.6	Wilton	36	17.4	162.9	964
116.9	17.4	Washburn, b		17.9	145.5	618
184.8	17.9	Underwood	7	9.7	127.6	484
144.5	9.7	Coleharbor	7	23.5	117.9	250

State Highway No. 1

Total Mileage Read Down	Intermediate Mileage Read Down	Towns and Cities	Also on No	Intermediate Mileage Read Up	Total Mileage Read Up	Population
0.0	0.0	S. D. Line		7.0	228.0	
7.0	7.0	Ludden	11	11.0	221.0	154
18.0	11.0	Oakes	11	17.0	210.0	1,509
35.0	17.0	Verona a	13	21.0	193.0	243
56.0	21.0	Hastings		20.0	172.0	138
76.0	20.0	Valley City......	9-10	27.0	152.0	4,695
103.0	27.0	Dazey		5.0	125.0	218
108.0	5.0	Walum		3.0	120.0	125
111.0	3.0	Hannaford		11.0	117.0	439
122.0	11.0	East Jct. No. 7, b		17.0	106.0	
139.0	17.0	Binford		18.0	89.0	288
157.0	18.0	Pekin	15	19.0	71.0	198
176.0	19.0	Lakota	2	13.0	52.0	869
189.0	13.0	Brockett		6.0	39.0	262
195.0	6.0	Lawton		19.0	33.0	192
214.0	19.0	Nekoma		14.0	14.0	199
228.0	14.0	Langdon	5	0.0	0.0	1,239

a—LaMoure is nine miles west of south junction Nos. 1 and 13, one-half mile south of Verona. Lisbon is 19 miles east of junction of Nos. 1 and 27, 5.5 miles north of Verona.

b—Cooperstown one and one-half miles east on No. 7.

State Highway No. 5

0.0	0.0	Joliette	44-81	11.0	344.5	221
11.0	11.0	Hamilton	81	9.0	333.5	179
20.0	9.0	Cavalier	18	36.0	324.5	810
56.0	36.0	Langdon	1	24.0	288.5	1,239
80.0	24.0	Clyde		17.0	264.5	268
97.0	17.0	Rock Lake	4	23.0	247.5	239
120.0	23.0	Rolla	30	22.5	224.5	636

168.0	23.5	Max	23	28.5	94.4	429
196.5	28.5	Minot	2-9	36.7	65.9	12,245
233.2	36.7	West Jct. No. 5..		17.0	29.2	
250.2	17.0	East Jct. No. 5...		6.1	12.2	
256.3	6.1	Westhope		6.1	6.1	416
262.4	6.1	U. S.-Can. Line..		0.0	0.0	

a—There is a cut-off road generally travelled from St. Anthony to Flasher, leaving No. 6 at St. Anthony and joining No. 21 one mi. east of Flasher. Via this road Flasher is 39 mi. from Mandan.

b—Lewis & Clark trail runs west from Washburn 16 miles to Lewis and Clark campsite of 1804 and 1805.

State Highway No. 18

0.0	0.0	S. D. Line		12.0	255.0	
12.0	12.0	Stiles	11	17.0	243.0	16
29.0	17.0	Wyndmere	13	32.0	226.0	511
61.0	32.0	Leonard	46	19.0	194.0	189
80.0	19.0	Casselton	10	8.0	175.0	1,416
88.0	8.0	Amenia		6.0	167.0	100
94.0	6.0	Arthur		7.0	161.0	246
101.0	7.0	Hunter		11.5	154.0	387
112.5	11.5	Blanchard		16.0	142.5	113
128.5	16.0	Mayville	7	3.0	126.5	1,345
131.5	3.0	Portland	7	14.0	123.5	530
145.5	14.0	Hatton		12.0	109.5	768
157.5	12.0	Northwood	15	10.0	97.5	915
167.5	10.0	Kempton		6.0	87.5	210
173.5	6.0	Larimore	2	17.0	81.5	865
190.5	17.0	Inkster		18.0	64.5	323
208.5	18.0	Jct. No. 17		9.0	46.5	
217.5	9.0	Hoople		6.0	37.5	258
223.5	6.0	Crystal		6.0	31.5	334
229.5	6.0	Hensal		9.0	25.5	125
238.5	9.0	Cavalier	5	15.0	16.5	810
253.5	15.0	Neche	55	1.5	1.5	469
255.0	1.5	U. S. Can. Line..		0.0	0.0	

142.5	22.5	Dunseith	3	19.0	202.0	382
161.5	19.0	Bottineau		26.0	183.0	1,067
187.5	26.0	East Jct. No. 6...		17.0	157.0	
204.5	17.0	West Jct. No. 6..		10.0	140.0	
214.5	10.0	Mohall		36.0	130.0	598
250.5	36.0	Bowbells	8-9	13.0	94.0	615
263.5	13.0	Flaxton	9	18.0	81.0	384
281.5	18.0	Columbus		12.0	63.0	471
293.5	12.0	—Noonan		13.0	51.0	363
306.5	13.0	Crosby	42	9.0	38.0	1,100
315.5	9.0	Ambrose (3 mi. no.)		13.0	28.0	364
328.5	13.0	Fortuna	85	16.0	16.0	185
344.5	16.0	Westby, Mont. ..		0.0	0.0	

State Highway No. 21

0.0	0.0	Cannonball	24	11.0	180.0	110
11.0	11.0	Solen		26.0	169.0	224
37.0	26.0	Flasher		8.0	143.0	285
45.0	8.0	Lark	31	10.0	135.0	38
55.0	10.0	Carson		15.0	125.0	283
70.0	15.0	Elgin	49	5.0	110.0	414
75.0	5.0	New Leipzig	49	20.0	105.0	385
95.0	20.0	Mott	8	14.0	85.0	810
109.0	14.0	Regent		24.0	71.0	231
133.0	24.0	New England ...	22	24.0	47.0	709
157.0	24.0	Amidon	85	23.0	23.0	151
180.0	23.0	Jct. No. 39	39	0.0	0.0	

State Highway No. 22

0.0	0.0	Reeder	12-16	36.0	102.0	248
36.0	36.0	New England ...	21	28.0	66.0	709
64.0	28.0	Dickinson	10	27.0	38.0	4.467
91.0	27.0	Manning		11.0	11.0	113
102.0	11.0	Killdeer, a	25	0.0	0.0	441

a—See log No. 25 for Canyon Tour via No. 26.

State Highway No. 4

Aberdeen, S. D. to Ellendale, 40 mi.

0.0	0.0	S. D. Line		5.0	258.0	
5.0	5.0	Ellendale	11	33.0	253.0	1,094
38.0	33.0	Edgeley, a	13	16.0	220.0	735
54.0	16.0	Nortonville		9.0	204.0	113
63.0	9.0	Millarton	46	19.0	195.0	113
82.0	19.0	Jamestown	10	13.0	176.0	7,230
95.0	13.0	Buchanan		7.0	163.0	212
102.0	7.0	Pingree	36	6.0	156.0	261
108.0	6.0	Edmunds		8.0	150.0	136
116.0	8.0	Melville	9	9.0	142.0	167
125.0	9.0	Carrington	7,9	8.0	133.0	1,315
133.0	8.0	Barlow	9	8.0	125.0	269
141.0	8.0	New Rockford ...	9	11.0	117.0	2,050
152.0	11.0	Sheyenne		10.0	106.0	525
162.0	10.0	Oberon		11.0	96.0	326
173.0	11.0	Minnewaukan	19	13.0	85.0	441
186.0	13.0	Brinsmade, b		19.0	72.0	164
205.0	19.0	Maza, c	17	9.0	53.0	85
214.0	9.0	Cando	17	24.0	44.0	1,055
238.0	24.0	Rock Lake.......	5	17.0	20.0	239
255.0	17.0	Hansboro		3.0	3.0	204
258.0	3.0	Manitoba Line ..		0.0	0.0	

a—LaMoure is 12 mi. east of west junction Nos. 4 and 13.

b—West junction Nos. 4 and 2 is 7 mi. north of Brinsmade.

c—East junction Nos. 4 and 2 is 6 mi. south of Maza.

State Highway No. 9

0.0	0.0	S. D. Line		1.0	414.1	
1.0	1.0	Havana		12.0	413.1	300
13.0	12.0	Forman	11	24.0	401.0	356
37.0	24.0	Lisbon	27	23.0	377.1	1,626
60.0	23.0	Nome		27.0	354.1	255
87.0	27.0	Valley City	10-1	20.0	327.1	4,695
107.0	20.0	Rogers	1	7.0	307.1	127
114.0	7.0	Leal		12.0	300.1	125
126.0	12.0	Wimbledon		8.0	288.1	447
134.0	8.0	Courtenay	20	14.0	280.1	328
148.0	14.0	Kensal		17.0	266.1	376
165.0	17.0	Melville	4	9.0	249.1	167
174.0	9.0	Carrington	4-7	8.0	240.1	1,315
182.0	8.0	Barlow	4	28.0	232.1	269
210.0	28.0	Fessenden		22.0	204.1	757
232.0	22.0	Harvey	3	11.0	182.1	2,019
243.0	11.0	Martin		10.0	171.1	195
253.0	10.0	Anamoose		9.7	161.1	484
262.7	9.7	Drake	14	9.9	151.4	636
272.6	9.9	Balfour		11.3	141.5	222
283.9	11.3	Bergen		6.0	130.2	319
289.9	6.0	Voltaire		6.3	124.2	166
296.2	6.3	Velva		6.0	117.9	872
302.2	6.0	Sawyer		16.5	111.9	183
318.7	16.5	Minot	2-6	8.5	95.4	12.245
327.2	8.5	Burlington		10.3	86.9	219
337.5	10.3	Foxholm		8.6	76.6	219
346.1	8.6	Carpio	28	9.6	68.0	265
355.7	9.6	Donnybrook		15.0	58.4	304
370.7	15.0	Kenmare		16.6	43.4	1,388
387.3	16.6	Bowbells	5-8	13.0	26.8	615
400.3	13.0	Flaxton	5	13.8	13.8	384
414.1	13.8	Portal		0.0	0.0	446

State Highway No. 7

0.0	0.0	Hillsboro, a	81	18.0	245.5	1,162
18.0	18.0	Mayville	18	3.0	227.5	1.345

21.0	3.0	Portland	18	24.0	224.5	530
45.0	24.0	Finley	32	20.0	200.5	572
65.0	20.0	Cooperstown, b..	45	24.0	180.5	1,007
89.0	24.0	Glenfield	20	27.0	156.5	200
116.0	27.0	Carrington	4,9	12.0	129.5	1,315
128.0	12.0	Sykeston	30	8.0	117.5	326
136.0	8.0	Heaton		7.5	109.5	196
143.5	7.5	Bowdon		6.0	102.0	265
149.5	6.0	Chaseley		5.0	96.0	167
154.5	5.0	Hurdsfield	3	10.5	91.0	275
165.0	10.5	Goodrich		6.5	80.5	454
171.5	6.5	Denhoff	14	8.0	74.0	325
179.5	8.0	McClusky		12.0	66.0	625
191.5	12.0	Mercer	41	10.0	54.0	269
201.5	10.0	Turtle Lake		17.3	44.0	472
218.8	17.3	Underwood	6	9.7	26.7	484
228.5	9.7	Coleharbor	6	17.0	17.0	250
245.5	17.0	Garrison		0.0	0.0	714

a—No. 7 starts from point on No. 81 seven miles north of Hillsboro and one mile south of Cummings.

b—East Junction Nos. 7 and 1 is one and one-half miles west of Cooperstown.

State Highway No. 25

0.0	0.0	Stanton a	31	0.0	97.0	299
14.0	14.0	Hazen		10.0	83.0	464
24.0	10.0	Beulah		8.0	73.0	626
32.0	8.0	Zap		7.0	65.0	345
39.0	7.0	Golden Valley ...		16.0	58.0	318
55.0	16.0	Halliday	8	10.0	42.0	278
65.0	10.0	Werner		11.0	32.0	209
76.0	11.0	Dunn Center		4.0	21.0	304
80.0	4.0	Killdeer	22	17.0	17.0	411
97.0	17.0	Grassy Butte, b	85.0	24.0	0.0	50

a—Stanton is 20 mi. from Center via Nos. 31 and 43 Center is 38 miles from Mandan via No. 43.

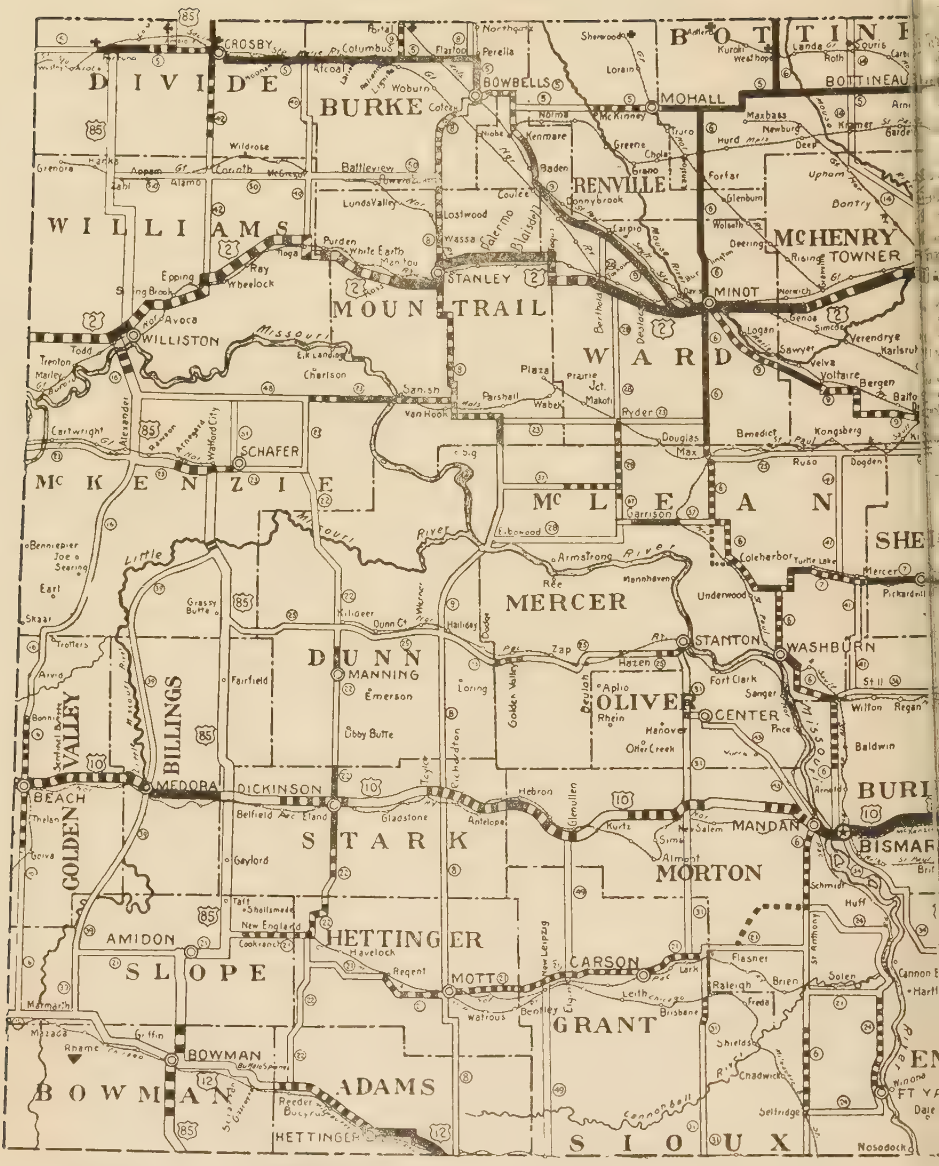
b—So-called Canyon Tour via No. 26.

State Highway No. 23

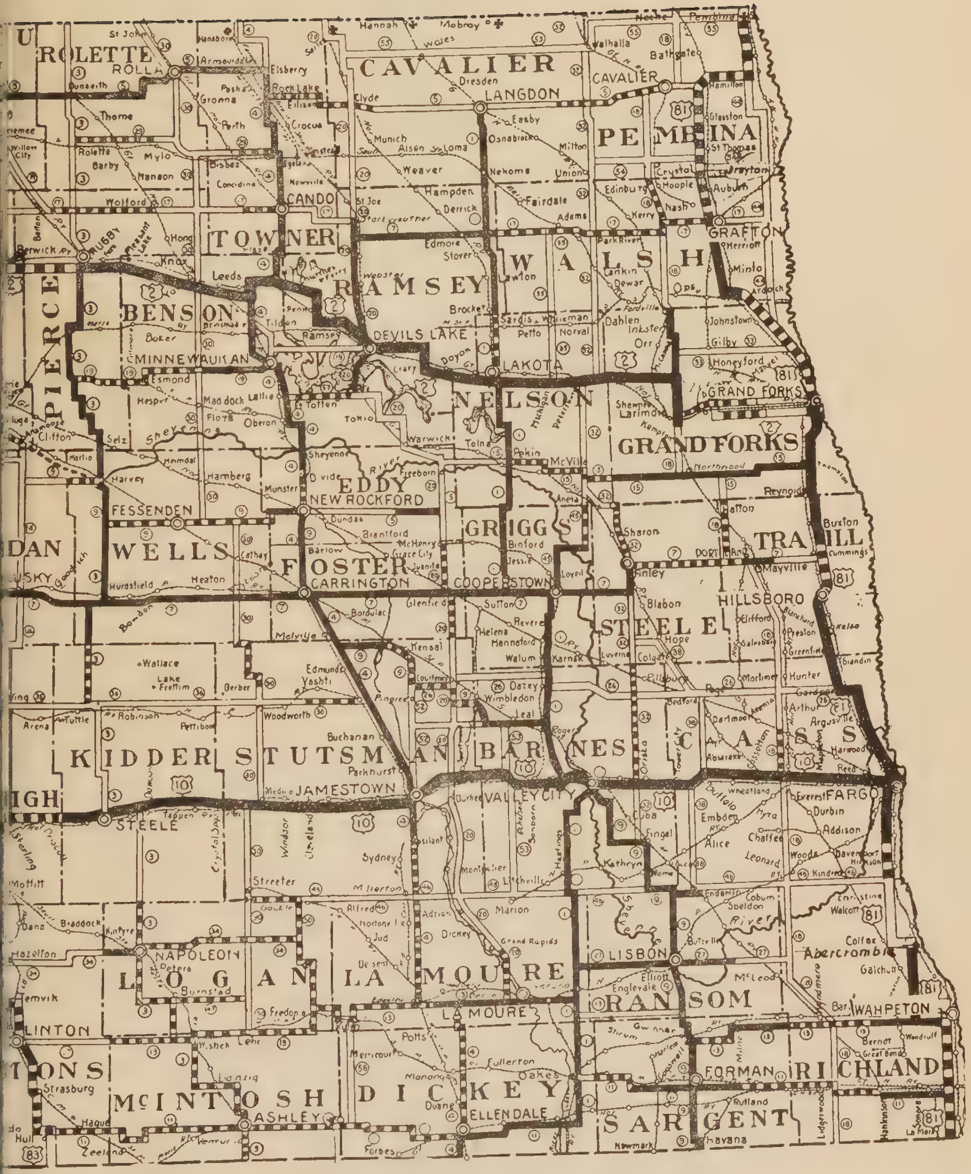
0.0	0.0	Martin	9	20.0	223.2	375
20.0	20.0	Kief		8.5	203.2	171
28.5	8.5	Dogden		12.0	194.7	237
40.5	12.0	Ruso		7.0	182.7	92
47.5	7.0	Benedict		10.0	175.7	121
57.5	10.0	Max	6	27.0	165.7	429
84.5	27.0	Ryder	28	24.0	138.7	422
108.5	24.0	Parshall	8	11.0	114.7	455
119.5	11.0	Van Hook		13.0	103.7	368
132.5	13.0	Sanish		47.8	90.7	296
180.3	47.8	Watford City....	85	8.0	42.9	427
188.3	8.0	Arnegard	85	5.5	34.9	220
193.8	5.5	Rawson	85	6.2	29.4	161
210.0	6.2	Alexander	85	16.8	23.2	356
216.8	16.8	Cartwright		6.4	6.4	213
223.2	6.4	Fairview, Mont..		0.0	0.0	213

State Highway No. 36

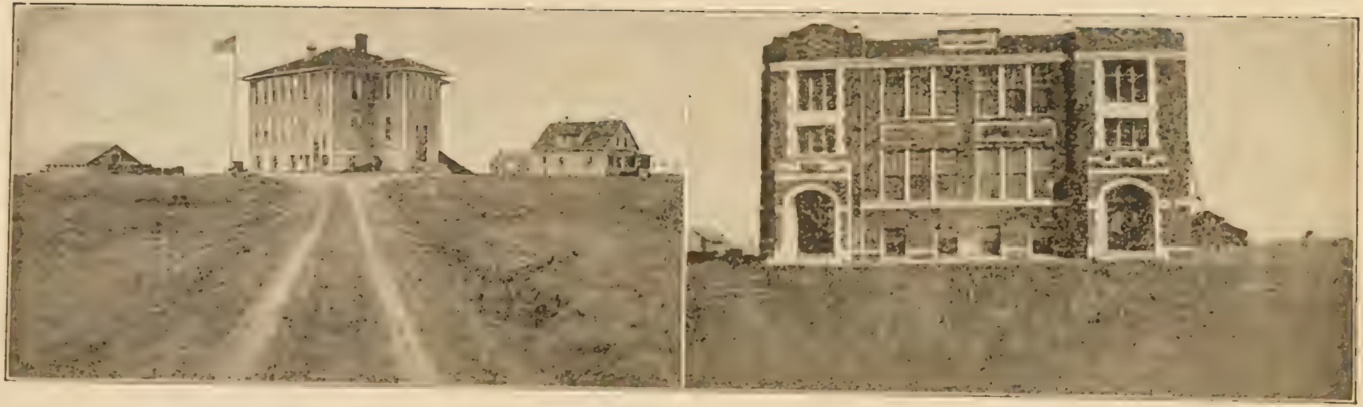
0.0	0.0	Pingree	4	21.0	85.6	261
21.0	21.0	Woodworth	30	12.0	64.6	245
33.0	12.0	Pettibone		14.6	62.6	268
47.6	14.6	Robinson		10.5	48.0	234
58.1	10.5	Tuttle	3	7.0	37.5	351
65.1	7.0	Arena		6.0	30.5	148
71.1	6.0	Wing	14	13.0	24.5	183
84.1	13.0	Regan		11.5	11.5	163
85.6	11.5	Wilton	6	0.0	0.0	964



A highway map of North Dakota.



(Courtesy of North Dakota Highway Commission)



(Courtesy of N. P. Ry.)

Typical consolidated high schools. (Left) The Noltimier High School in Barnes County. (Right) The Gackle High School in Logan County.

CHAPTER XX

SCHOOLS AND INSTITUTIONS

The educational system of the state is divided into two parts, the public schools and the higher institutions of learning. The former are under the direction of the Superintendent of Public Instruction; the latter are directed by the Board of Administration.

The Public Schools

The public school system embraces graded and ungraded country schools, consolidated schools and village schools. Cities which are organized as special districts are not under the supervision of the State Superintendent.

The State Superintendent of Public Instruction provides a course of study for the whole system, makes regulations for the certification of teachers, and inspects the system through high school and rural school inspectors. Each school is supported by taxes upon the property of the school district, though financial aid is given by the state to those schools which meet certain standards of equipment, training of teachers, etc.

With the consent of the voters two or more districts may be consolidated and thus secure sufficient funds to build a "consolidated school", which may offer as much as four years of high school work. These consolidated schools have developed rapidly and have made it possible for most North Dakota children to secure a high school education within a few miles of their home.

The Higher Institutions of Learning

The state provides for the higher and professional education of its people by a state university at Grand Forks, an agricultural college at Fargo, a state science school at Wahpeton and five teacher training institutions located at Valley City, Mayville, Minot, Dickinson, and Ellendale. There is also a blind school at Bathgate and a school for the deaf at Devils Lake.

The State University

The University of North Dakota was located at Grand Forks by the state constitution. It consists of a college of liberal arts, a college of letters, a teachers college, a school of mines, a school of medicine and a law school. Connected with the university is a training high school where students at the teachers college obtain training in teaching.

The College of Agriculture

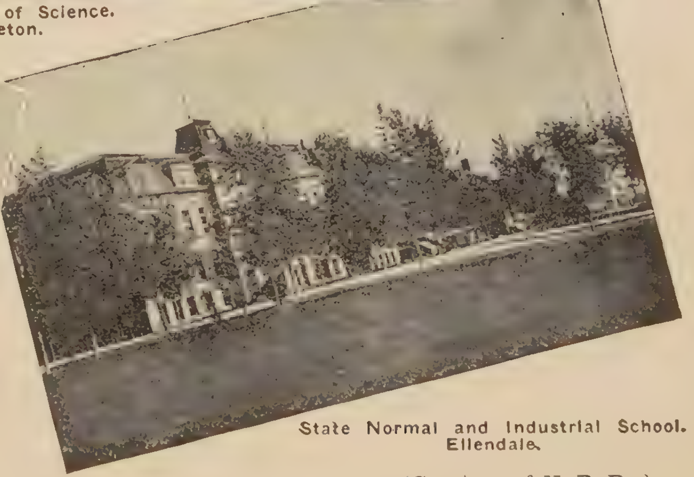
The Agricultural College was founded by the state constitution and was located at Fargo, where it opened its doors for the first time in 1890. Its purpose is to give scientific and practical training in agriculture and other industries. It has experimental stations in various parts of the state and cooperates with the United States Department of Agriculture in making surveys of the soil, resources, plants and animals of the state. The college is supported mainly by appropriations from the state legislature, but some departments get assistance from the federal government.

The Teachers Colleges

Three teachers colleges are located at Valley City, Mayville and Minot. These colleges train teachers for the high schools, graded schools and rural schools of the state. They admit only high school graduates and confer the degree

State School of Science.
Wahpeton.

State Teachers College.
Valley City.



State Normal and Industrial School.
Ellendale.

(Courtesy of N. P. Ry.)

Some of our higher institutions of learning.

of bachelor of arts in education upon their graduates. They are supported mainly by appropriations by the legislature.

The Normal Schools

Two normal schools, located at Dickinson and Ellendale, are well equipped to train teachers for the elementary schools. The State Science School at Wahpeton gives scientific training in the trades and mechanical industries. A School for the Deaf at Devils Lake and a School for the Blind at Bathgate take excellent care of their students, training them for useful, enjoyable lives in spite of their handicaps.

The School Lands

The enabling act which specified the provisions by which North Dakota might become a state of the Union was passed by Congress in 1889. Through the foresight of one of our pioneers, General Wm. H. H. Beadle, this law set aside two sections of land (16 and 36) in every township of the state for the support of the public schools, with the provision that this land could not be sold for less than ten dollars per acre.

In addition to this provision for the public schools several of the state institutions were given large grants of public land. The university was given 80,000 acres, the college of agriculture 40,000 acres, the normal school at Valley City 50,000 acres, the normal school at Mayville 30,000 acres, and the normal school at Ellendale 40,000 acres. These institutions get the rent from their respective grants or the interest on the money for which the land is sold. This income does not entirely support the institutions in any case, but it lessens the burden of taxation.

The Denominational Schools

Various religious denominations maintain schools and colleges in different parts of the state. Jamestown College is a Presbyterian institution. Wesley College is located at Grand Forks and is annexed to the State University. The Congregationalists maintained Fargo College at Fargo for many years, but were obliged to close its doors during the depression of 1922. Various Catholic orders conduct academies at Grand Forks, Jamestown and Wild Rice and parochial schools in connection with many of their churches.

The Charitable Institutions

In addition to its colleges and schools the state maintains institutions for the care of its dependent and defective people. The State Insane Asylum is located at Jamestown. It is a large institution giving excellent medical care to its many inmates. The State Hospital for the Feeble Minded is located at Grafton. A Soldiers' Home is beautifully situated at Lisbon where veterans of three wars find quiet rest.

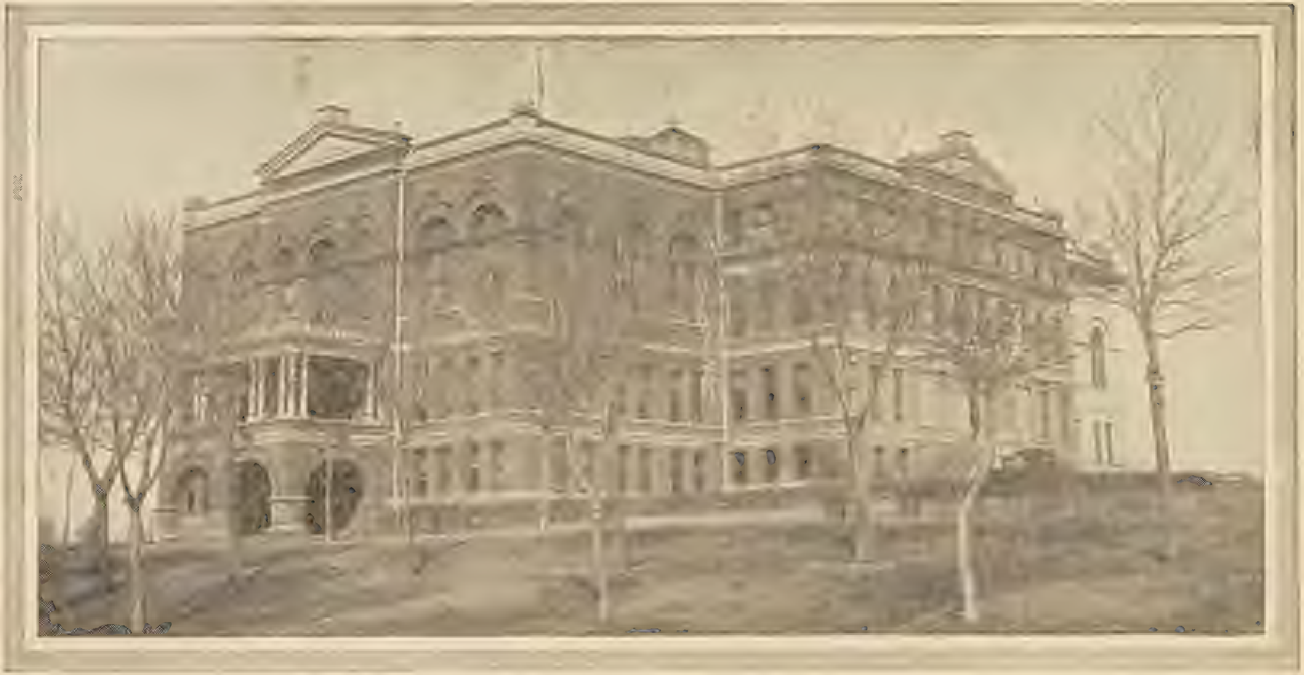
The Penal Institutions

The state maintains two penal institutions, the Penitentiary at Bismarck and the State Training School at Mandan. The Penitentiary houses criminals sentenced for long terms, many for life imprisonment. There is a twine factory in connection which keeps the inmates at useful work. Some are taught trades and those who are able are often let out for contract labor on roads or other public works.

The Training School at Mandan is maintained for the correction of boys and girls with criminal tendencies, whose parents have been unable to give them proper character training. They are given an elementary education and taught farming and other useful industries and trades.

The Capitol

The capitol buildings have a sightly location on the hill just north of Bismarck, overlooking the valley of the



(Courtesy of N. P. Ry.)

The State Capitol.

Missouri River. The main building is a large brick structure, but much too small for the many departments which it has to house. It was built in 1883.

A few years ago the state built the Historical Building on the capitol grounds to house the library and museum of the State Historical Society, the State Library and the Legislative Reference Library. This is a large and beautiful granite building, well suited to its purposes.

A fund is now being developed for the construction of a new capitol building. It is expected that a building that we can be proud of will be erected in a few years.

CHAPTER XXI

OUR PARKS AND PLAYGROUNDS

The National Parks and Reserves

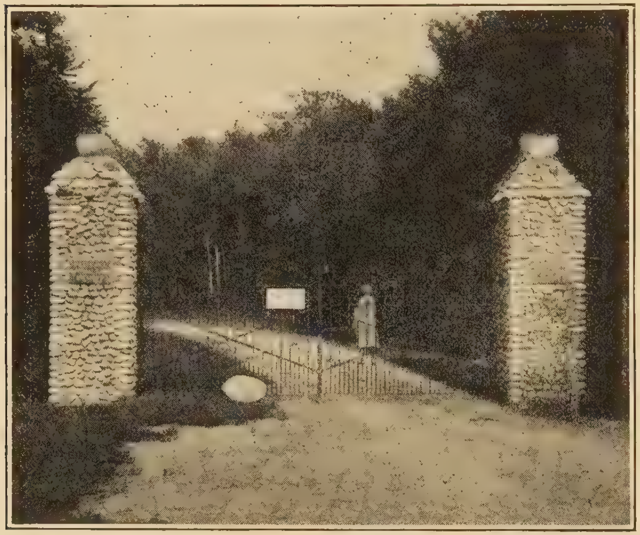
North Dakota is well supplied with parks, well distributed over the state, located in historic places or in spots of unusual beauty, where they are used for picnicking and recreation. There are two national parks, Sully's Hill Park, on the south side of Devils Lake, and the Verendrye National Park at Sanish. Also, a large tract in the Badlands has been proposed as a national park to be known as the Roosevelt Memorial Park, but the necessary action has not been taken by Congress.

There is a national forest in the Badlands of the southwestern part of the state, which has been set aside for the development of pine lumber. To help in the preservation of bird life the federal government has located two bird refuges, one on an island in Stump Lake, fourteen miles south of Lakota and one at Chase Lake in Stutsman County. Besides these there are many state, county and city parks. The principal ones are described separately in the following pages.

The Sully Hill National Park

The largest of our national parks is located on Sully's Hill, a prominent, wooded hill on the south shore of Devils Lake. It was named after General Alfred Sully, the Indian fighter so prominent in the campaigns of 1863 and 1864. It is often stated that there was a battle at Sully's Hill, but this is not true. General Sully made an expedition from Fort Rice, twenty-five miles south of Mandan, to that place in 1865 and located the site of Fort Totten, but there was no battle there.

Sully's Park was established by act of Congress in 1904.



The entrance to the Sully Hill National Park.

It consists of 800 acres. A number of buffaloes, elks and white-tailed deer are protected there and a pleasant camp is maintained for tourists and visitors.

The Verendrye National Park

A national park of 307 acres was established in 1917 on Crow-Flies-High Butte just south of Sanish, near the northern boundary of the Fort Berthold reservation, to commemorate the coming of the first white man to North Dakota. In 1738 Pierre Verendrye, a French nobleman, made an expedition from his fur trading post west of Winnipeg to one of the Mandan Indian villages near the Missouri River. This village site has never been located, but while there Verendrye's son made a short trip to another Indian village located near the site of Sanish. Two years later Verendrye's two sons came again to that village and went on southwest, probably to the Bighorn Mountains. The ruins of this old village near Sanish have long since been washed away by the Missouri River, but it is appropriate that this spot visited by the first explorers in this state should be preserved as a national park.

The Proposed Roosevelt National Park

There is a project on foot to set aside a large area in the Badlands along the Little Missouri River as a national park of scenic interest. The owners of this land favor the project. It still remains, however, to secure the recommendation of the Federal Park Board and to secure the necessary appropriation by Congress.

(Photo by Russell Reid)

The famous Arctic explorer, Roald Amundsen, visiting the Roosevelt cabin.

The proposed park, appropriately named in honor of Roosevelt, who lived within its boundaries at one time as a ranchman, would include the principal features of the Badlands which the tourists have been most interested in. These are the Petrified Forest, the Chateau de Mores, the sites of Roosevelt's Elkhorn Ranch and Chimney Butte Ranch, and the burning coal mines.

The Petrified Forest is located a few miles north of Medora on the west side of the Little Missouri River. It has to be reached by fording the river from the Peaceful Valley Ranch. There are no standing trees there as one might imagine from the name, but the ground is strewn with large petrified stumps and logs, the remains of giant trees which once grew there, some of which went to form our coal fields, others to rot away in the earth and their places to be taken by the silicon in the soil, thus becoming "petrified."

There is a popular notion that when a tree or other object "petrifies" it turns into stone. This is not true. The land where the trees grew sank and was covered with water. The trees died and fell, and in the course of ages became covered with many feet of sand and mud. As the wood gradually rotted, a substance in the water called silicon filled each little place left by the rotting wood. By the time the tree was all rotted its place was entirely filled with silicon, and there was a silicon tree where there had been a tree of wood.

Silicon is the ingredient of granite which makes it so hard. For this reason petrified trees are also very hard. In some instances this process of "petrifying" is so complete that the grain of the wood may be clearly seen.

The places where Roosevelt ranched for some time are points of interest to travelers. His Elkhorn Ranch, named from a pair of interlocked elk horns found there, was thirty-five miles north of Medora near the Little Missouri River. The ranch house has been torn down and the timbers have been hauled away. All that remains is the grove of cottonwoods where the cabin stood. Roosevelt's first ranch in the Badlands was several miles south of Medora, near the Chimney Butte, after which it was named. Some years ago the cabin was taken to the capitol grounds at Bismarck where it is now visited by thousands of travelers.

In the early eighties the Marquis de Mores, a French nobleman, came to this country and bought several thousand acres in the Badlands of this state. He built a packing plant at Medora and a chain of meat markets along the Northern Pacific Railroad through this state. His venture failed and he went back to France with his family a few years later. The packing plant was destroyed by fire in 1906 but the old De Mores Chateau, or dwelling, still stands on the hillside west of Medora, with all the furniture, just as it was left. It is now used as a tourists' home and is a place of unusual interest.

There are several burning coal mines scattered through the area of the proposed park. These mines have been described in the chapter on surface features. In all, this extremely rough and picturesque region with its many buttes, its great masses of scoria, its outcroppings of coal and its blue and white clay is a fascinating country worthy of becoming a national park.

The State Parks

North Dakota has a system of State Parks, of which the State Historical Society is custodian. Under this system state parks are located wherever they will preserve spots of special historical interest. This is done with the understanding that the state will pay for half the cost of keeping them in good condition if the local community will pay half.

In this way many state parks have been established. Some of them contain several hundred acres, others only a few square rods with a marker explaining the significance of the place. The principal state parks are located at Fort Abercrombie, Fort Lincoln, Fort Rice, Walhalla, and Pembina.

The Fort Abercrombie park contains six and one-fourth acres. It is just east of the village of Fort Abercrombie, in Richland County. The fort was built in 1858 to protect the Sisseton and Wahpeton bands of Sioux and as a freighting station on the trails leading along the Red, Sheyenne and James valleys. It was the first federal fort built in the state.

Fort Abraham Lincoln, six miles south of Mandan on the west bank of the Missouri, has been commemorated with a park of seventy-five acres. It was built by General Custer in 1873, the same year the Northern Pacific Railroad was built as far as the Missouri River at Bismarck. Its purpose was to establish a base from which soldiers could protect the surveyors for the railroad through the western part of the state. It was from there that General Custer and his Seventh Cavalry left in the spring of 1876 on the campaign against the Teton Sioux, which resulted in the death of Custer and his immediate command of 268 men. All that remains is several heaps of brick and mortar where the principal buildings stood. The park also contains the ruins of old Fort McKean on the bluff to the west and an old Indian village to the north.

About twenty-five miles south of Fort Lincoln is the site of Fort Rice, which was established by General Alfred Sully in 1864 as one of a series of forts along the Missouri River to keep the Teton Sioux from coming east of the river. Nothing now remains of the fort but the cellars of some of the buildings which mark the square shape of the fort.

The Pembina State Park is located in the very northeastern corner of the state within the village limits of Pembina. It preserves the site of the first trading post in the state, built by Chaboilez in 1797 and the site of "Pembina House" built by Alexander Henry in 1801. It also commemorates the establishment of the village of Pembina, the first permanent settlement in the state, by the colonists sent from Scotland by Lord Selkirk in 1811, and the location of Fort Pembina built in 1870 to protect the friendly Chippeways from the Sioux. It was at Pembina that the first school and first church in the state were built.

At Walhalla, where the Pembina River breaks through the Pembina Mountains to the level bottom of the Red River Valley, a state park preserves the spot where Norman Kittson and Alexander Henry had trading posts. It is a beautiful place filled with the memory of many historic incidents of a century ago.

The Sibley Trail Parks

General H. H. Sibley pursued the Santee Sioux westward through this state in the summer of 1863, passing with his army up the valley of the Sheyenne nearly as far as Binford, thence southwestward to the Missouri River ten miles south of Bismarck. His troops entrenched every night against a possible Indian attack, and each camp was named after some officer in Sibley's army.

Major Dana Wright has located every one of these Sibley camps, and through his efforts most of them have been made into small state parks and appropriately marked. Three battlefields on this line of march in Kidder and Burleigh counties where were fought the battles of Big Mound, Dead Buffalo Lake and Stony Lake, have been similarly preserved by appropriate parks and markers.

The Battlefield Parks

In addition to the three parks commemorating the battles at Big Mound, Dead Buffalo Lake and Stony Lake, there are three other battlegrounds set aside as parks. O'Brien's Coulee, one mile east of Olga in Cavalier County, is the place where some traders and their allies, the Chippeways, defended themselves against their constant enemy, the Sioux, in 1848. The site was given to the state as a park by Mr. J. B. Beauchamp of Olga.

Homer State Park, a few miles south of Jamestown in the James Valley, marks the scene of some early conflict between white soldiers and the Indians. The nature and date of the battle are unknown. There are five acres in this park.

Where General Sibley defeated the Sioux at Whitestone Hill in Dickey County in 1863 the federal government set aside a section of land as a park. Later this park was given to the state and 600 acres of it was sold as a means of improving the remaining 60 acres, where the battle took place. An attractive monument has been erected there in memory of the soldiers who gave their lives in that conflict.

There should be a state park at the Killdeer Mountains to preserve the field of Sully's battle against the Sioux in 1864. It has been recommended, but the matter has been held up pending the action of Congress concerning the establishment of a Roosevelt National Park, which would include the Killdeer Mountains.

The Memorial Parks

Two parks have been established in the state in memory of soldiers of the World War.

A park of sixty-three acres has been set aside a few miles northwest of Streeter by the people of that community in memory of their young men who served in the World War. It is used as a community playground.

A very attractive memorial park has been set aside by LaMoure County just north of Grand Rapids. It is a beautiful place on the James River and is used as a county playground. Similar playground parks, dedicated to the memory of World War veterans, have been set aside by Stutsman County at Spiritwood Lake and by Nelson County at the east end of Stump Lake.

A small park in honor of Fred Smith, who gave his life for liberty in 1917, was set aside by his parents in 1924 a few miles south of Jamestown. It is used as a preserve for the native wild flowers of North Dakota.

Old Indian Village Sites

In different localities in the state small pieces of land have been set aside to preserve the ruins of old Indian villages. There are many old village sites of the Mandan, Hidatsa and Arikara Indians along the Missouri River and a few in other parts of the state. These sites are being secured by the State Historical Society as they can get the funds. All of these old villages should be preserved, but almost every year marks the destruction of one of them. Some are washed away by the river. Some are plowed up by someone who is not interested in them. Due to the efforts of Mr. George F. Will of Bismarck about all of these village sites have been located, identified and charted.

CHAPTER XXII

OUR CITIES

Number and Size of Cities

North Dakota is definitely a rural state. Compared with most other states its cities are few and small. In the United States census any community of 2,500 or more people is considered a city. According to the 1920 census there are only twelve such cities in the state. These are, in order of their size: Fargo, Grand Forks, Minot, Bismarck, Jamestown, Devils Lake, Valley City, Mandan, Williston, Dickinson, Wahpeton, and Grafton. Most, if not all, of these cities are larger now than in 1920. Yet, at the present time, only three are over ten thousand and only one of them, Fargo, is over 25,000.

Reasons For Their Location

As North Dakota was settled by people coming mostly from Minnesota and other neighboring states to the east the movement of population was toward the northwest. The railroads were extended toward the west, north and northwest. Wherever a main line crossed an important river a village sprang up which became a local market and point of distribution for the surrounding country.

Look on the map and notice how many of our cities grew up at the crossing of a river. Name them. Can you tell how this came about? The reason is this: the first settlers took up their homesteads in the river valleys in order to have water for their stock. Naturally, then, their local market would be where the railroad crossed the river.

This village would receive produce for shipment and distribute machinery, lumber and other needed supplies to the surrounding territory. Thus, as the railroads extended westward and northwestward through the state, the last town would always be the distributing point for the country farther on, and would go through a "boom" period at that time. The time of most rapid development for most of the state—the "boom" time—was from 1885 to 1900. In the northwestern part of the state it continued for ten or fifteen years longer. Since then the population has remained about the same, except in special cases.

Every citizen of North Dakota should visit the various cities of the state when possible and while there take time to become acquainted with their prominent factories, stores, schools, churches, parks, museums, monuments, etc. Let us look briefly at some of the chief features of those places classed as cities in the 1920 census.

Fargo

The city of Fargo was founded when the Northern Pacific was built across the Red River in 1871, and, excepting Pembina, is therefore the oldest settlement in the state. Then a village of tents, it has grown to a city of over 30,000. It early became the chief market for the Red River Valley and its location at the crossing of two transcontinental railroad systems made it the most important dis-

The Fargo High School, one of the finest in the Northwest.

tributing point of this northwestern region.

Fargo is a very important commercial center. It is the third largest distributing center for farm machinery in the world. Aside from the two main railways it is the northern terminus of the Milwaukee Railroad. Forty-two passenger trains leave Fargo daily. There are eighty-eight wholesale firms and several factories which manufacture brick, tile, flour, crackers, trunks and various implements.

There is every evidence that Fargo is a well-kept city. It has forty-five miles of paved streets and excellent fire and water systems. It has sixteen miles of street railway and a good aviation field. There are two excellent hospitals, twenty-eight churches, three clinics, three sanitariums, five libraries and six service clubs.

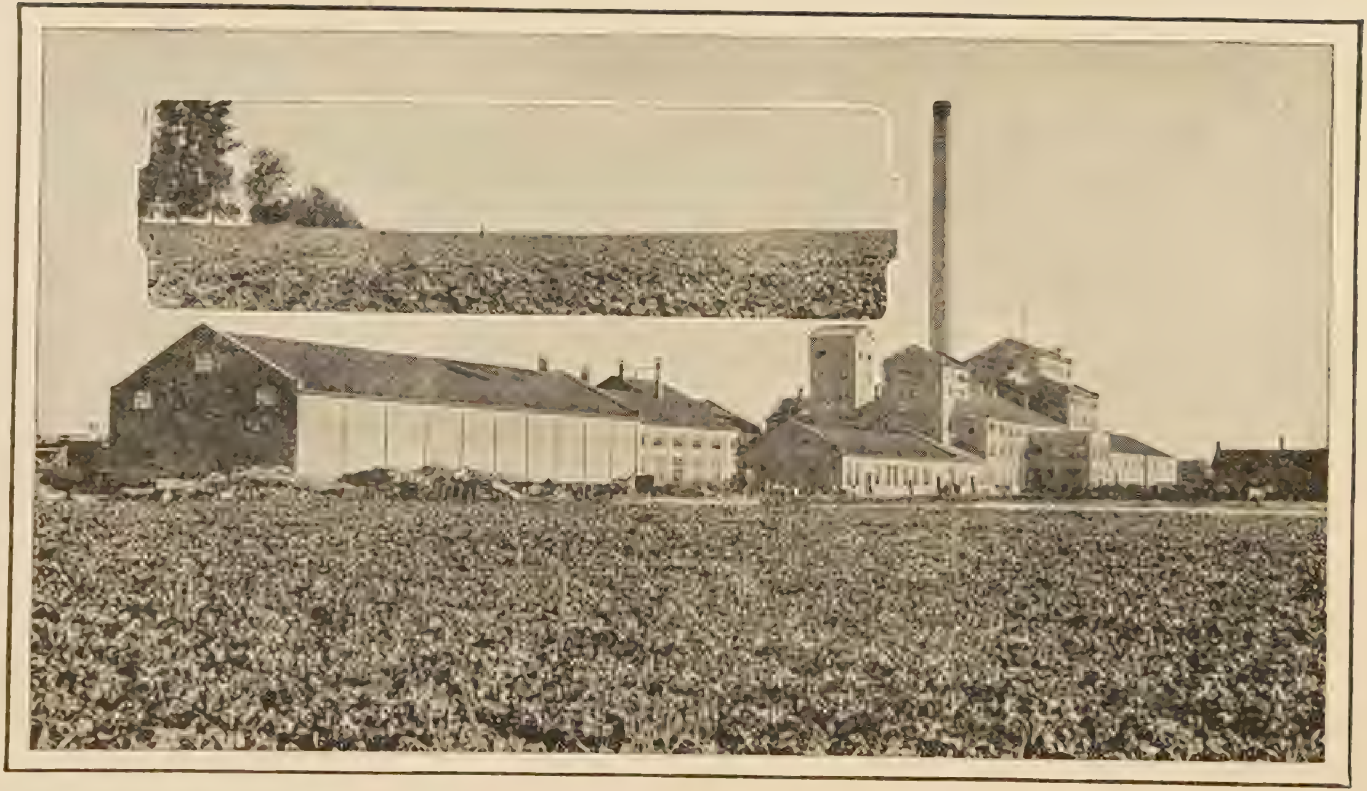
Education is well provided for. The state college of agriculture is located there. There are three business colleges, three denominational schools, a conservatory of music, a girls' seminary, an auto-tractor-airplane school. A million dollar high school and twelve grade schools constitute one of the most efficient and well equipped educational systems in this part of the country.

Fargo is a popular convention city. It has twenty hotels and is well supplied with large auditoriums and dining halls.

Grand Forks

Grand Forks was first established as a fur trading post and named from its location at the forks of the Red and Red Lake rivers. Steamboat navigation on the Red River was prominent in the early days. Since the building of the Great Northern Railroad to that point it has developed rapidly into the second largest city of the state. It now has a population of about 16,000.

Grand Forks is the principal market for the lower Red River Valley and has long been an important distributing point for the territory farther north and west. Among its manufactures are brick, tile, concrete, flour, meat and



(Courtesy of G. N. Ry.)

The sugar beet factory at East Grand Forks.

printing. The state mill is located there. Just across the river in Minnesota is the largest sugar beet factory in this part of the country, erected at a cost of one and one-half million dollars.

Education is exceptionally well provided for. The state university, located there, ranks well among the universities of the land. Connected with the university are the state school of mines and Wesley College, a Methodist denominational school. There are two conservatories of music and an excellent public school system. There are fifteen churches and two good libraries.

Minot

Minot was located when the Great Northern Railroad was built across the Mouse River in 1888. In forty years it has grown to a city of 15,000 people.

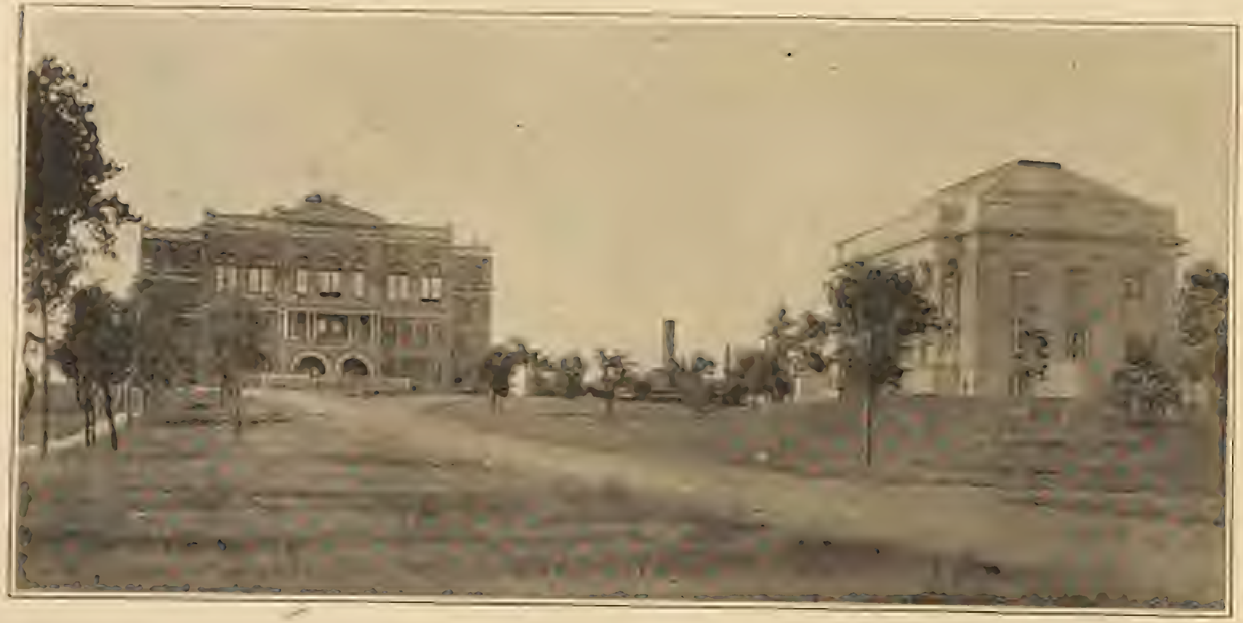
Situated at the junction of two transcontinental railroads, the Great Northern and the "Soo", Minot soon became the chief market and distributing point for the northwestern part of the state. Not only is it the center of a very rich farming country but it also lies at the edge of the great coal field and in recent years has become an important mining point. Its wholesale trade is large and covers a wide territory.

Minot has 20 miles of paving, 200 acres of parks and two golf courses. The Minot State Teachers College is located there, and there is a very efficient system of public schools.

The Great Northern shops at Minot employ about 1,000 people. The bank deposits, the rapid growth of population and the rapid building of both business blocks and residences show the city to be in a most prosperous condition.

Bismarck

Bismarck had its beginning when the Northern Pacific Railroad reached the Missouri River in 1873. It became the capital of Dakota Territory ten years later and has



(Photo by Russell Reid)

The state capitol and new memorial building at Bismarck.

been the capital of North Dakota since the state was admitted to the Union in 1889. It is the chief distributing point for the Missouri slope and has a large wholesale trade in the central and western part of the state. It is an important shipping point for both grain and livestock.

Bismarck is well equipped as a trading center. Aside from the main line of the Northern Pacific, extending east and west, the "Soo" comes into the city from the southeast and extends northward along the river. In the early days Bismarck was the center of the steamboat traffic of the upper Missouri, but this river traffic has since been taken up by the railroads which parallel the river.

Bismarck now has a population of about 10,000. Its shipment of butter, eggs and poultry totals about 3,000,000 pounds annually. It has sixteen miles of paving, a good water plant, two excellent hospitals, fourteen churches, and good hotel accommodations. Fort Lincoln is located two miles south and there is an Indian school in the western part of the city.

Jamestown

Jamestown was founded in 1872 where the Northern Pacific Railroad crossed the James River. It is now a delightful residence city of 7,000 people, beautifully located in the wooded valley more than a hundred feet below the level of the surrounding prairie. Jamestown is the county seat of Stutsman County, and is the market and distributing point for quite a large territory. It is a division point of the Northern Pacific Railroad. Its chief products are flour and cream. Jamestown College and the State Hospital for the Insane are located there.

Devils Lake

The county seat of Ramsey County, Devils Lake, is situated on the north shore of the lake from which it takes its name. It is located on the Great Northern, Soo and Farmers Grain railroads, and is the market for what is known as the lake region of the state.

Devils Lake has a population of about 6,000. Within or near the city are located the State School for the Deaf, the State Military Reservation and the State Biological Station. South of the city on the lake shore there is a large and beautiful chautauqua park.

Valley City

Valley City, in earlier days called Worthington and Wahpeton, was located where the Northern Pacific crossed the Sheyenne River in 1873. It now has a population of about 6,000 and is recognized as one of the most delightful residence cities of the state, situated as it is in the sheltered and beautifully wooded valley of the Sheyenne, 150 feet below the surrounding plain. The city is fortunately located at the crossing of two transcontinental railroads, the Northern Pacific and the Soo.

(Courtesy of N. P. Ry.)

One of the five farms of the Northwest Nursery Company at Valley City. The Northern Pacific bridge in the background.

Valley City is the natural market for the central Sheyenne Valley and has a large wholesale and retail trade. The two largest business concerns are the Northwest Nursery and the Russell-Miller Mill. At the north end of the city the Northern Pacific Railroad crosses the valley on one of the largest bridges in the state, 160 feet high and nearly a mile in length. From this bridge travelers look down upon the beautiful chautauqua park and the city beyond.

The Valley City State Teachers College, the largest in the state, is located there and there is a very efficient system of public schools. The new Mercy Hospital is one of the best equipped in the state. The city is known as an educational and musical center.

Mandan

Mandan, known as the place where the west begins, is located at the confluence of the Heart and Missouri rivers. It is a division point on the Northern Pacific Railroad, from which branches of that railroad extend northwest and southwest. The city is a distributing point for a large part of the Missouri slope. It is the county seat of Morton County.

Mandan is surrounded by a coal mining territory. It ships large quantities of grain and livestock. The Federal Great Plains Experimental Station located there has been of great value in the development of the western part of the state. The city is connected with Bismarck and the east by the beautiful memorial bridge across the Missouri River.

Williston

Williston is a city of about 5,000 population, situated on the Missouri River and the Great Northern Railroad. It is the county seat of Williams County and is the central market and distributing point for the upper Missouri Valley in western North Dakota and eastern Montana.

Williston is in an excellent coal mining and farming region. It is at the southern end of the North Dakota Pumping Project, which irrigates a large area in the valley of the Little Muddy Creek.

Dickinson

Dickinson is a manufacturing city and shipping point on the main line of the Northern Pacific. It is the county seat of Stark County. It ships large quantities of wool, coal, wheat and livestock to eastern markets. It is near the center of the great coal fields and profits from many coal mines in that vicinity. The Lehigh Briquetting plant is only a few miles east of the city.

Dickinson is also at the center of the great deposits of tertiary clay, with its wonderful possibilities for the manufacture of brick, pottery and aluminum.

The Dickinson State Normal School is located there, training teachers for the schools of the Missouri slope. The population is about 5,000.

Wahpeton

Wahpeton is the county seat of Richland County and has a population of about 4,000. It is fortunately located at the junction of three railroads, the Great Northern, the Northern Pacific and the Milwaukee, thus having excellent shipping facilities. The surrounding country is very fertile and produces excellent grain and livestock. The Ottertail and Bois de Sioux rivers unite at that point to form the Red River, and help to make Wahpeton an attractive residence city. The State Science School and an Indian school are located there.

Grafton

Grafton, the county seat of Walsh County, is an important market and distributing center in the lower Red River Valley. It is a pleasant residence city of about 4,000 people. The state hospital for the feeble minded is located there.

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